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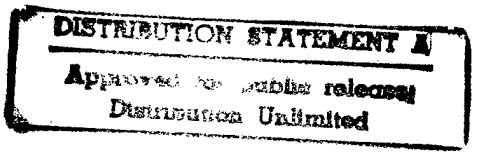

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SCIENCE & TECHNOLOGY

USSR: SCIENCE & TECHNOLOGY POLICY

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ORGANIZATION, PLANNING, COORDINATION

REORGANIZATION PROBLEMS AT UZBEK SSR ACADEMY OF SCIENCES

Tashkent EKONOMIKA I ZHIZN in Russian No 10, Oct 86 pp 2-5

[Article: "Almost Without Changes.... How Reorganization Is Proceeding at the Uzbek SSR Academy of Sciences"; capitalized passages published in boldface]

[Text] Who does not know with what speed a scientific idea becomes obsolete in our age: 6-8 years go by and it has been hopelessly thrown to the side of scientific and technical progress.

And whom does it not worry that the implementation of a scientific idea today takes on the average 8-9 years--this is for the country, while in the republic this time is even longer.

The question, it would seem, is rhetorical, but, unfortunately, it turned out that it is possible to give an entirely specific answer to it.

To begin with let us go back several years and look at the list of most important scientific and technical developments, the rapid use of which in the national economy was envisaged by party documents back during the 11th Five-Year Plan. Let us keep an eye on one line: "The Technology of Obtaining the Fungicide Olgin."

And now let us see what the Presidium of the republic Academy of Sciences is proposing for inclusion in the section "The Development of Science and Technology" of the State Plan of Economic and Social Development of the Uzbek SSR for 1986--the second year of the 12th Five-Year Plan. In the list of uncompleted developments (it is not too long--there are only 27 of them) it is easy to see the familiar combination of words: "The Technology of Obtaining the Fungicide for Green Plantings--Olgin." The wording has been changed slightly, but the same work belongs to the same Institute of Plant Chemistry of the Uzbek SSR Academy of Sciences.

The first thought, which arises here, is how not to sympathize with the scientists, whose development (to all appearances, a quite significant one: the new preparation promised apple orchards and vineyards reliable protection against diseases, the economic impact from its use should have come to

2,600-5,000 rubles per hectare) for such a long time did not find a practical demand.

But after the first thought a second thought inevitably comes: Did the scientists do everything so that their proposal would get to those for whom it was intended? And here it turns out that the institute did not see its job through--the results of the pilot production tests, without which no development can be included in either sectorial or especially state plans, so far are lacking.

We will not dwell now on the objective and subjective reasons, for which the institute for so many years was not able to "outfit," as it should have, its creation for the trip from the laboratory to the works--it is a question now not of this. Let us state the question more broadly--the Academy of Sciences, which all these years had reckoned this preparation on the credit side of completed developments, which were proposed for introduction, if only once showed an interest: What in this specific case is hindering this introduction? The very repetition of the same suggestion over such a lengthy interval of time, its "transfer" from one document, which comes from the walls of the academy, to another one, which is drawn up for another department and is marked with another date, which is so far away from the former date--is this really not occasion to be alarmed, to ponder, and to investigate?

Let us turn again to the scientific developments, which were offered by the Uzbek SSR Academy of Sciences to the national economy back at the beginning of the last five-year plan. And we will see that not only the work of the Institute of Plant Chemistry (if it were the only one, it would be possible to recognize the situation as an exceptional and to some extent chance one), but also several other suggestions of scientists "migrated" from there to the present. For example, "The Method of the Pre-Incubation Irradiation of Eggs for the Increase of Productivity in Poultry Breeding," which was developed by the Institute of Biochemistry of the Uzbek SSR Academy of Sciences. It is merely unclear why in past years its anticipated economic impact increased by nearly 1.5-fold. Were the efforts of the scientists of the institute really focused on precisely this "improvement" of the calculation? Such sharp wording on our part would not have the right to exist, if the named development was one among many others, which had been completed during this period and is of indisputable value for the national economy. In this case the persistence of the scientists, who from year to year have continued to insist on the introduction of their method, could not arouse anything but respect. But this, let us repeat, is only on the condition of successful progress also in other directions of the research being conducted by the institute. Unfortunately, it is hardly possible to regard the suggestions, which have been submitted by biochemists for inclusion in the State Plan of the second year of the current five-year plan, as confirmation of success: of the three developments the State Planning Committee was able to include only one (the same method of the pre-incubation irradiation of chicken eggs) in the draft of the State Plan of Economic and Social Development of the Republic for 1987. As for the other two, they are already being used at medical institutions of the republic.

In itself such a fact can only give pleasure, but why suggest for tomorrow what is already being used today?

Let us state frankly: it does not look as if at the headquarters of scientific thought of the republic they would subject to any critical evaluation at all what the scientific institutions subordinate to it declare as an innovation requiring introduction. For example, the Physical Technical Institute is depicting as such an innovation the FTI-1 instrument for the measurement of the specific volume of cocoons, but by this time it has already been introduced at all the bases of the primary processing of cocoons. Let us note, incidentally, that this instrument, just as several developments already named by us, was listed among the completed ones already at the beginning of the past five-year plan.

What is behind this--the ignorance of those who are required to know all this, indifferent disinterest in the matter, for which they have been charged to be responsible, or--let us not be afraid to call a spade a spade--an attempt to conceal the real state of affairs? For if from the 27 innovations, which have been recommended by the academy for introduction in the national economy, you subtract the ones, the use of which is already envisaged by the sectorial plans of ministries and departments (and there are 12 such developments), what will remain? And when the developments, which should be returned to the authors "for refinement," since they were submitted without the results of pilot production tests, the necessary technical and economic substantiations, and so forth, drop out of this remainder, what will the practical contribution of academic science be?

These distressing results, moreover, on the scale of not a single year, but an entire five-year plan, were summarized at one of the plenums of the Tashkent City Party Committee: "Of the 49 completed scientific and technical developments of institutes of the Academy of Sciences only 25 were accepted for introduction for the 12th Five-Year Plan by planning organs of the republic and only 4 of them are intended for their assimilation by industry. The remaining developments were rejected due to the impracticality and inefficiency of their use."

Such a situation in academic science formed, of course, not today--it is to a significant degree a consequence of the negative, stagnant phenomena, which were spoken about with complete straightforwardness and adherence to principles at the 31st Uzbek CP Congress. The need for reorganization is obvious to everyone, and it is sufficient to listen to how representatives of academic science speak at conferences of any level in order not to doubt: the concept of acceleration for them is the battle cry of the day. Let us recall several such statements.

I.I. Iskanderov, academician secretary of the Philosophical, Economic, and Legal Sciences Department of the Uzbek SSR Academy of Sciences: "We are well aware that in the activity of the Academy of Sciences there are shortcomings and unresolved issues, which do not make it possible to utilize fully its great scientific potential. The main directions of science, which follow from the needs and specialization of the republic in the system of the socialist social division of labor, have not yet been elaborated. The existence of a

large number of small scientific subdivisions, which work separately and inefficiently, stems from this...."

Professor B.M. Beglov, director of the Institute of Chemistry of the Uzbek SSR Academy of Sciences: "Not 'the patching of holes in old caftans,' but the elaboration of fundamentally new solutions, which are capable of bringing production up to the highest level of productivity and quality, is now required of scientific institutions."

Corresponding Member of the Uzbek SSR Academy of Sciences M.M. Khayrullayev, director of the Institute of Oriental Studies: "It is necessary to begin the improvement of work with reorganization in science, the activity of the republic Academy of Sciences...."

It would seem that everyone understands in what direction it is necessary to act, everyone realizes that it is impossible today to live and work in the old way....

And all the same much remains in the old way.

As in previous years, the institutes of the Academy of Sciences continued to propose for introduction in production developments, which have already been used for many years in sectors of the national economy--the analysis of the proposals, which were recommended by the Presidium of the Academy of Sciences for inclusion in the draft of the State Plan for 1987--an analysis made by the Uzbek State Planning Committee jointly with ministries, departments, associations, and enterprises of the republic--attests with all obviousness to this.

As in previous years, the group of scientific institutions, whose research is becoming a practical contribution to the national economy, is narrow. All 27 of the above-named developments were submitted by...8 institutes. And what about the remaining 18 academic institutes of the natural sciences and technical type? The priority development of basic and theoretical research, which makes breakthroughs into new fields of knowledge and provides outlets to a new level of efficiency, is indisputable. But the need to combine efficiently basic and applied research is just as indisputable. And the latter should satisfy the present requirements of production. Here it is not out of place to note that it was considered advisable to include in the draft of the State Plan works of only three of the eight institutes: the Institute of Nuclear Physics--four instruments, the Institute of Chemistry--one development, the Institute of Biochemistry--also one development. That is all.

As in previous years, among the developments turned over for introduction there are also encountered such developments, the topicality and practical value of which approximate the one which at one time was proposed by the Institute of Microbiology and was called "The Directed Growing of Active Races of Yeast for Apple Wine Making." A significant percentage of the scientific recommendations are instructions and various procedural directions.

In particular, the situation, which has formed at the Kibernetika Scientific Production Association, which is the only organization in the Central Asian Region, which is called upon to solve comprehensively the basic problems of theoretical and applied cybernetics, attests that academic science so far has not made a sharp turn in the direction of research which lies in the main directions of scientific and technical progress.

While acknowledging the achievements which this association has to its credit, it is impossible not to direct attention to the dispersal of its resources among numerous and inefficient themes. In 1985 the proportion of developments with an annual economic impact of more than 100,000 rubles came here to only 13 percent. And those of them, the economic impact of which is in the range of 40,000 rubles, accounted for 60 percent. The "forcing" onto clients of simplified calculations or problems of the automation of accounting, which are already being used in the country, has become customary in the practice of the association. "The Calculation of the Need for Trucks by Ministries and Departments," which in the report for 1985 was named as introduced (an economic impact of 51,000 rubles), was rejected by the Transportation and Communications Department of the Uzbek SSR State Planning Committee owing to its imperfection. And this is not the first such case at the Kibernetika Scientific Production Association. Last year our journal told about the unenviable fate of the system of the recognition of the code numbers of transportation units, which was developed here and owing to which motor transport depots could record the time of both the departure and the arrival of vehicles and thus, according to the assurances of the designers, shorten the layovers of transport and increase labor productivity. The promised economic impact was expressed in the amount of 10 million rubles. But the republic Ministry of Motor Transport came to the conclusion: this development does not yield either a shortening of the layovers or an increase of labor productivity....

Today at the Kibernetika Scientific Production Association there are no operations which would receive all-union recognition. And on the scale of the republic for the present there is nothing in particular to boast of. The attempts to establish a plant technical management automation system for the cotton ginning industry--the most important sector of Uzbekistan--proved to be futile. A laboratory of automated control systems of construction has been operating here for 15 years, there are certificates on introduction with an indication of the economic impact, but in practice there are no operating systems in any construction department of the republic.

That is how matters stand in one of the most important scientific subdivisions of the Uzbek SSR Academy of Sciences, which has a mighty scientific and technical potential and by its very essence is obliged to be at the rapids of scientific and technical progress and to a significant extent to determine its directions in the republic.

The spirit of changes has also not properly touched other scientific institutions, which are called upon to be on the front line of scientific and technical progress--the institutes of power engineering and automation, mechanics and seismic resistant construction, polymer chemistry and physics.... But how can one describe, for example, the activity of the

Thermal Physics Department of the Academy of Sciences, where the return from each invested ruble is 7 kopecks!

The following fact clearly shows the degree of novelty and efficiency of what has been nurtured for years at many academic institutes: according to the data of recent years, there is only 1 inventor's certificate per 26 scientific associates. Here it is perhaps possible to name many such inventions, not to mention discoveries, in which the republic could take pride at the world level, and such directions of research, in which we would be the leaders in the country. Incidentally, how is one to determine whether in each specific case we are in the vanguard or rearguard of domestic and world science, if patent and license work has been organized extremely poorly and its level to no extent satisfies the present requirements.

Well-known Soviet scientist Academician V. Struminskiy, winner of the Lenin and State Prizes, while reflecting on the right of several institutes to exist, once expressed his opinion as follows:

"...Recently I was present at the report of the director of one outlying institute of mechanics. Yes, there are a number of interesting operations there, but the same kind of operations are being performed, as is known, in a number of other places. I asked the speaker: 'Can you name such sections of theoretical and applied mechanics, in which your institute is the leader in the country, that is, the strongest, most authoritative one?' He waivered for a long time, but was never able to reply.... It seems to me that today every director of an academic or educational institute should have a clear answer to this question."

Is there an answer to this question in the headquarters of scientific thought of the republic? To be the leaders in the country in their field of science is a high reference. But only in this way is it possible to measure in our times the return of each institute. And, moreover, of each individual scientist. If we judge from several of the developments, which the Presidium of the Academy of Sciences considered worthy of inclusion in the State Plan of Social and Economic Development of the Republic for 1987, the criteria, by which it was guided here, were much lower.

Let us say that a "plank" was placed with close attention to yesterday. But life requires the heights of tomorrow to be taken today. Otherwise what kind of acceleration is this?

At the Academy of Sciences they also approached "in yesterday's way" such a matter, which is directed toward the future, as the organization of engineering centers. Their goal is the rapid development, large-scale introduction, and highly efficient use in the national economy of new advanced technologies, materials, and equipment. Specialists believe that such centers justify themselves, if they are organized under scientific institutions, at which basic research was responsible for the development of fundamentally new technology or equipment, and, hence, not only is a gain of time achieved, but the conditions for the origination of solutions, which do not have analogs in the USSR and abroad, also appear. Is it possible to regard the Kibernetika Scientific Production Association as such a scientific institution? Is such

basic research in its arsenal? Above we have already stated--at present this association does not have scientific results of such a scale. How, then, was its inclusion as the base scientific institution simultaneously in two engineering centers--the Motor and the Manipulator Engineering Centers--justified?

It is worth looking a little closer at how the work is being developed, suppose, at the Motor Engineering Center, which united subdivisions of the Kibernetika Scientific Production Association and the Tashkent Motor Plant (TMZ), in order to see: everything reduces to the development of automated control systems on the basis of standard automation equipment and computer hardware. Here is what the center "had time to do" in half a year--from the moment of its establishment (we are citing an official document): the plan of work for 1986 and the program of operations for the future to 1990 were approved; two developments: "The Automated Registration of the Movement of Materials Through the Warehouse" and "The Automation of the Designing of the Technology of the Nesting and Cold Stamping of Blanks," were accepted by the division of plant management automation systems of the Tashkent Motor Plant; a work group made up of five people was sent to the Volga Motor Vehicle Works (Togliatti) to become familiar with the plant technical management automation systems of machine shops, which are used there....

It somehow hardly seems like a search for solutions, which do not have analogs in the country and abroad. But it looks very much as if ALL THE APPROACHES REMAINED OLD WITHIN THE FRAMEWORK OF NEW ORGANIZATIONAL FORMS.

Do these approaches perhaps stem from the fact that at the academy they are merely speaking about the need to open all the flood gates for the influx of young scientific forces, but inexplicably little is still being done for this? And in comparison with the beginning of the 11th Five-Year Plan the number of young scientists not only has not increased, but has decreased appreciably. And the average age of chiefs of sectors and laboratories has topped 50. And even the average age of graduate students is approaching 30....

But in our age scientific ideas rapidly become obsolete, and tomorrow it will be too late to do what has not been done today.

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EFFICIENCY, SOCIAL ORIENTATION OF TURKMEN RESEARCH

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR: SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 4, 1986 (manuscript received 30 Jul 86) pp 3-6

[Article by O.G. Ovezgeldyyev: "On the Efficiency and Social Orientation of Scientific Research"; capitalized passages published in boldface]

[Text] It is well known that the formation and development of science of Soviet Turkmenistan took place in close connection with the tasks of the building and development of socialism. Here scientists of the republic made many gains and made a significant contribution to the development of scientific and technical progress and the solution of the socioeconomic problems of the republic [3, 4].

The decisions of the 27th CPSU Congress, which approved the policy of the acceleration of the socioeconomic development of the country, envisaged the further improvement of Soviet society--the fundamental updating of its material and technical base and the improvement of social relations and, first of all, economic relations. Profound changes in the content and nature of labor and in the material and spiritual conditions of the life of the Soviet people and the stimulation of the entire system of political, social, and ideological institutions are also required. In the solution of these complex and vitally important problems a special place is being assigned to the acceleration of scientific and technical progress and the stimulation of the human factor.

The essence of the problem of the current period consists in the sharp increase of the efficiency of research, the strengthening of its socioeconomic orientation, and the acceleration of the practical implementation of the results of scientific research developments in the sectors of the national economy. The analysis of the state of affairs at scientific institutions of the republic shows that both in the assurance of a social orientation and in the increase of the scientific level and efficiency of research difficult and responsible work lies ahead for scientists of the republic. Unfortunately, many scientific developments today rely not on fundamentally new scientific ideas or even on the highest experimental and theoretical level of research. While the large amount of information, which is being accumulated as a result of the fulfillment of what are called "ordinary themes," is not being brought

up to the level of generalizations in the form of a new scientific concept, a new theory, or a quantitative model of phenomena and processes.

The increase of the efficiency and quality of scientific research presumes the availability of highly competent, broadly educated, and politically mature personnel. At present a large detachment of such specialists work at the scientific institutions of the Turkmen SSR Academy of Sciences. At the same time we are experiencing a significant shortage of highly skilled scientists in such priority directions of science as applied mathematics, electronics, computer technology, the automation of scientific research, biotechnology, and others. This is primarily a result of the fact that the training of personnel via graduate studies, and especially special-purpose graduate studies, was carried out in isolation from the real needs of the development of scientific and technical progress. It is necessary to revise quickly the list of the range of specialties in graduate studies as a whole and to bring it in line with the tasks of the development of science and technology in the republic. A certain decrease of the creative activity and mobility of scientists is also occurring. The scientific collective of today is a complex social organism, of which the primary party organization is the political nucleus. Therefore, the authority and personal example of communist scientists are a powerful lever in the increase of the creative activity of scientists. The revelation of the creative activity of the individual is a delicate, difficult, and many-sided matter. Here it is important in principle to give this process a social orientation, to reject standardized methods, and to use an individual approach to scientists. It should be emphasized that the competence, mobility, and socially oriented creative activity of scientists constitute the basis of the increase of the efficiency of scientific research and the development of scientific and technical progress.

The planning, coordination, and integration of scientific research need substantial improvement. There are still instances, when the same themes, some of which simply remain unfinished, are elaborated for many years under different names. In the choice of the directions of the study of the problem and themes of scientific research not the social need, but the interests of the collective, which is the performer, often prevail. The information supply of scientific collectives remains very low. Laboratories and institutes are inadequately informed about the details of the work of other related and associated scientific subdivisions. It is obvious that in the matter of increasing the efficiency of scientific research the smaller the scientific and technical potential is, the greater significance the level of the information supply and coordination of scientific research has. Science cannot be soundly developed, if the lively creative exchange of opinions and scientific ideas has not been organized. In this connection the stimulation of the work of laboratory, institute, and interinstitute scientific seminars, as well as the radical improvement of the work of scientific councils are of particular importance. It is obvious that the leading scientists, the party organizations and boards of directors of institutes, and the bureaus of the departments of the Turkmen SSR Academy of Sciences should display particular interest in the solution of these problems.

The efficiency of the work of scientific collectives in many respects depends on the level of the material, technical, and experimental base and the use of

means of the automation of scientific research. In recent years considerable attention has been devoted to the supply of scientific laboratories with new instruments and equipment. The construction of the Collective-Use Computer Center of the Turkmen SSR Academy of Sciences has been completed. Nevertheless the capital-labor ratio of the scientific institutions of the Turkmen SSR Academy of Sciences for the present is approximately one-half as great as the average union level. This especially concerns the institutes of the Biological Sciences Department. Scientific development does not seem possible without the constant updating of the material and technical base of scientific laboratories and their supply with new and the latest instruments and equipment. The radical improvement of the construction of scientific facilities of the Turkmen SSR Academy of Sciences is of fundamentally great importance.

The Communist Party and the Soviet state always devoted and are devoting much attention to the development of science, and considerable resources are being allocated for this. At the same time the real influence of science on the economy for the present still remains low. The state and efficiency of science of the republic and, in particular, the scientific institutions of the Turkmen SSR Academy of Sciences were subjects of serious and just criticism at the 23d congress and subsequent plenums of the Turkmen CP Central Committee. Just critical remarks meant for Soviet science were also heard from the rostrum of the 27th CPSU Congress. Scientists of the republic perceived them as a party mandate on the radical improvement of the organization and management of science and the increase of its efficiency.

In this connection the integration of science and production and the acceleration of the introduction of the achievements of scientific and technical progress in the national economy require radical improvement. In recent years many new and advanced forms and methods of the planning and management of scientific and technical progress have been developed: goal program planning and the establishment of scientific and technical societies, scientific production associations, interbranch scientific technical complexes, engineering centers, and temporary scientific collectives. The experience of the work of the leading scientific centers of the country shows that the proper and sound use of these advanced forms affords an extensive opportunity for the acceleration of scientific and technical progress. Low scientific and technical preparedness and the poor economic substantiation of the recommendations being advanced are hindering the rapid introduction of the achievements of scientific and technical progress. A no less important factor that is checking this process is the unreceptiveness of production to the achievements of science and technology and the lack of resolution of a number of economic and financial issues which are connected with introduction. In short, the extremely oversimplified approach of both scientists and production workers of the republic to this difficult issue, which is important to the state, is getting in the way. In the immediate future it is necessary to make a complete inventory of the scientific recommendations, which are being proposed for introduction, from the standpoint of their socioeconomic significance, degree of elaboration, and readiness in accordance with the existing all-union state standards.

Guided by the decisions of the 27th CPSU Congress and the 23d Turkmen CP Congress, the scientific collectives of the Turkmen SSR Academy of Sciences adjusted the plans of scientific research and revised the structure of scientific institutions. About 50 small scientific laboratories and sectors were eliminated, the certification of scientists for the purpose of regulating the remuneration of their labor in conformity with the real results of work was carried out. But it is necessary to regard all this as the beginning of much difficult work on the reorganization of the activity of the Academy of Sciences. Speaking about reorganization, M.S. Gorbachev at a meeting with workers of Togliatti noted: "It is necessary to begin first of all with a change in thinking and psychology, in organization, in the style and methods of work....

"Reorganization should occur at each workplace, in each labor collective, in organs of management, in party and state organs.... But in any case it presumes that everyone should do his job honestly, conscientiously, with the full exertion of efforts and knowledge.

"If it is a question of the production worker, he should ensure discipline and organization in work, high productivity, and product quality, save what is at his disposal, and use resources economically. If it is an engineer or scientist, he is called upon to make the maximum contribution to the development of scientific and technical progress and the modernization of the national economy on the basis of the achievements of science and technology. If it is a question of a management worker, his obligation and direct duty are to ensure the extensive use of new methods of management and the prompt settlement of all questions, on which the end results and the efficiency of the economy depend" [2].

We have to:

--support goal-oriented basic research, which makes it possible to obtain fundamentally new scientific, technical, technological, and practical solutions;

--increase the proportion of the technical sciences in the system of the Turkmen SSR Academy of Sciences;

--strengthen even more the economic and social orientation of science, having directed particular attention to the acceleration of the introduction of the results of scientific developments in the sectors of the national economy;

--use extensively modern advanced forms and methods of planning, management, and organization in science on the basis of the formation of temporary scientific collectives, engineering centers, interbranch scientific technical complexes, and others;

--change radically the approach to the coordination of academic, sectorial, and VUZ science, it is necessary to change over from the coordination of plans to the coordination of operations, in other words, from the "coordination of documents" to the coordination of activity;

--improve substantially the training and education of scientists, since today a heightened sense of what is new, a high professional level and creative activity, efficiency, and the ability to take national interests to heart are required of the scientist;

--raise the material and technical supply of scientific institutions to a new level;

--develop automated systems of scientific research.

The scale, complexity, and fast pace of the forthcoming work require a new, high level of the organization and management of scientific collectives, as well as the reform of the style of work of managers of scientific institutions. The results and quality of the work of any manager should be evaluated in accordance with specific deeds, in accordance with how he contributed to the revelation of creative activity and to the increase of the efficiency of scientific research. In short, in accordance with the end result--the solution of important scientific and national economic problems.

The most important means of the manager, which enables him to constantly keep in his hands ALL THE THREADS OF THE MANAGEMENT OF THE AFFAIRS OF THE COLLECTIVE, IS THE MONITORING AND CHECKING of the fulfillment of adopted decisions and issued orders. V.I. Lenin attached particular importance to this type of administrative activity of the manager: "We need the checking of the suitability of people, the checking of actual fulfillment.... To check people and to check the actual fulfillment of a job--the crux of all work, of all policy now lies in this, in this once again, and only in this" [1].

V.I. Lenin demanded the effective and systematic checking of the work in all the units of the state machinery and the establishment of the personal responsibility of all officials, no matter what official position they hold, for the fulfillment of the matters assigned to them.

Thus, a complex set of urgent tasks on the reorganization of the activity of scientific institutions in light of the new strategic policy of the party and the Soviet state faces the scientific collectives of the Turkmen SSR Academy of Sciences. The most important means of achieving this goal are well-meaning, socially oriented, valid, and positive criticism and self-criticism with the observance of scientific ethics and the standards of scientific intercourse; objectivity, competence, and openness in work; a realized sense of Soviet patriotism and internationalism; a knowledge of and the practical assimilation of the best traditions of Soviet and world science.

BIBLIOGRAPHY

1. Lenin, V.I., "Poln. sobr. soch." [Complete Works], Vol 45, p 16

2. PRAVDA, 9 April 1986

3. "Nauka Sovetskogo Turkmenistana" [Science of Soviet Turkmenistan], Ahskhabad, Ylym, 1984.

4. Ovezgeldyyev, O.G., "Science of Soviet Turkmenistan," IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR. SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK, No 5, 1984.

7807
CSO: 1814/90

SECTORIAL, ACADEMIC INTERBRANCH COMPLEXES COMPARED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 Feb 87 p 1

[Article by Ye. Leontyeva, deputy editor of SOTSIALISTICHESKAYA GAZETA for the Science and Technical Progress Department, under the rubric "Science and Production": "How Are Things at the Interbranch Scientific Technical Complexes?"; first paragraph is SOTSIALISTICHESKAYA INDUSTRIYA introduction; first in a series of installments]

[Text] Time is picking up the pace. The evolutionary concept "scientific and technical progress" is more and more often being superseded by another, far more dynamic one--"the scientific and technical revolution." An offspring of the latter is the MNTK [interbranch scientific technical complex]. You will agree, the abbreviation is not yet completely customary to the ear, but has already become familiar to the eye. And there are no doubts that soon it will firmly take its place next to NTR [the scientific and technical revolution]. We are linking great hopes with their activity--that is how the complexes were spoken about at the January CPSU Central Committee Plenum.

I. All Are Still in the Cradle....

Interbranch scientific technical complexes.... There are already more than 20 of them. There are no twins among them: each has its own, absolutely individual disposition. And a different origin. The Nefteotdacha, Robot, Rotor, and Mekhanobr complexes originated in sectors and also remained in their depths. The Antikor and Institut elektrosvarki imeni Ye.O. Patona complexes have completely different conditions, they cut across sectors. All the sectors need their products, but none of them is the real mother of the newborn. Seven complexes are from the USSR Academy of Sciences. Three are of a mixed nature and have two masters each.

The question of what their origin is, is not idle. Whether the interbranch scientific technical complexes will cope with that has been assigned to them depends in many respects on this. Namely: with the three- to fourfold acceleration of the cycle from the idea to the series, with the attainment by products of the world level and the exceeding of it. The 1st year showed that the complexes with sectorial subordination feel better. The process of their formation proved to be shorter, it occurred less painfully than for the others. And this is understandable. The sectors have an organized system of

the resource supply of their organizations and are able to use, whether well or poorly, the process of developing and duplicating new equipment. In their depths the complexes are being supplied and developed rather well at the expense of the ministries, having a direct outlet to their own, sectorial enterprises.

The academic complexes proved to be significantly weaker. The majority of them have not been able to properly plan their program and to establish reliable relations with production. In general, the Academy of Sciences, not having the possibilities of ministers, was not able to quickly set its own interbranch scientific technical complexes on their feet. And this is also explicable, since it is traditionally a state budget organization, of which production activity is not characteristic.

The Antikor Complex, of which the USSR State Committee for Science and Technology is the father, had--not to put in worse terms--no better a time. In its possibilities this parent is inferior to both ministries and the academy. The latter at any rate has if only the Central Supply Administration of the USSR Academy of Sciences, while what does the State Committee for Science and Technology have, except for office equipment?

The Antikor Complex is weak, its academic relatives are weak. The Svetovod Complex is in a cradle state. The Personalnyye EVM Complex is in a hitch: this is evident from that fact that the managers of this interbranch scientific technical complex have drawn up "catch-up," and not leading plans. They had to be turned back. The Nadezhnost mashin Complex--the entire year was in a search--operated without an approved plan.

How are they to be made equal in "weight categories" with the stronger complexes?

An idea as if suggests itself--attach them to sectors. Strictly speaking, the question of such attachment is now being worked on. The suggestion to attach three academic interbranch scientific technical complexes to ministries, having reserved for the USSR Academy of Sciences only scientific supervision, has been prepared. To give another two dual subordination: the academy plus a ministry. And here it is necessary to think very well about how to avoid collisions with the already familiar hidden rocks.

The point is that at the organizational stage the sectorial cradle is a blessing. But will it always be that way? Let us recall how a ministry of intersectorial works matured in the lap of another ministry--the Ministry of the Machine Tool and Tool Building Industry. It was maturing, never did mature, and turned into a departmental appendage of its parent. Let us recall the Norplast Scientific Production Association, which was established for intersectorial purposes within the Ministry of the Chemical Industry. It had to be shut down due to the complete inability to cope with its tasks. The temporary collectives, which are being established for the solution of intersectorial problems, are winning with enormous difficulty the right to existence.

On the tree of the sector everything intersectorial in the end withers--this, so to speak, is a historical fact. Here the Ministry of the Machine Tool and Tool Industry is attempting to orient its "own" Robot Interbranch Scientific Technical Complex mainly toward the robotization of machine tool building. The robotization of other sectors interests it far less, which the plan of work, which was submitted to the State Committee for Science and Technology, also showed. This complex has not received either a reliable status or the necessary number of specialists. Its main organization is one department at an institute, where the other departments deal with their "own" matters. It is slowly picking up speed, and then by means of the "picking stick," which the USSR State Committee for Science and Technology has to put into operation. True, the Robot Complex all the same has drawn up an all-union program of its activity, but the question is, how will it be implemented? Without getting to its heart, I will cite only the figures which were given to me at the USSR State Planning Committee. During the current five-year plan it is planned to produce 3,600 robots, on which it is necessary to spend 521 million rubles in order to obtain an impact of...388 million rubles.

It is here that the main danger lies. What today requires few expenditures--and it is actually cheaper to establish complexes in sectors--tomorrow may be expensive. That is precisely why it is now extremely important to study the features, in which some interbranch scientific technical complexes or others are strong, and to look closely at the experience, which is originating in their depths, and at the already found "sparks."

The Rotor Complex, for example, is interesting for a well thought out structure of interaction of science and production, which is not like the others. Its main organization is closely connected with the main institutes and main enterprises of the user sectors and with their pilot experimental base. The developments of the interbranch scientific technical complex are tested at its own design bureau, which has eight affiliates, then the prototype is relayed further for its duplication. Moreover, the participants are obliged in the shortest time to assimilate the mass output of the product, they bear responsibility for this. True, far from all the partners realized it. At a recently held meeting of the party and economic aktiv of the complex the ministries, which are not devoting proper attention to the development of rotary equipment, were sharply criticized. Apparently, the managers of the interbranch scientific technical complex need to display greater demandingness.

The other complexes also have their peculiarities. The Mikrokhirurgiya glaza and Nauchnyye pribory complexes are actively and not unsuccessfully appearing on the world market. The Mekhanobr and Katalizator complexes have prepared better than the others for appearance in industry. The Biogen and Membran complexes have a reliable basic reserve.

It is a question, of course, not of making an uncommon facial expression common. But of getting the present very arbitrary, even some degree amateur formation of the complexes into the groove of the scientific organization, in order to withstand sectorial independence more confidently.

This is also important because the model statute on interbranch scientific technical complexes was drawn up at the same time as their formation. It was practically impossible to foresee into what it would develop. The 1st year showed: even given this document the organizational work frequently proceeded according to the principle "one pulls one way, the other pulls the other way." Some, having forgotten everything, hastened to establish within the complexes engineering centers, keeping in mind the successes of the Institute of Electric Welding imeni Ye.O. Paton. Others attempted to lay their hands on as many industrial enterprises as possible in order to make everything at their own place and for themselves. Still others hastened to subordinate to the main department all the ones which belonged to the interbranch scientific technical complex, in order to have the maximum control influence on them.

No one can yet say with all certainty what is good and what is bad. Is that not why the organizational period of the formation of the complexes cannot come to an end for such an agonizingly long time? Many of them have become so bogged down in the organizational fuss that they have "forgotten" to turn out if only one new, leading development each. Undoubtedly, here the lack of unified management and a unified cementing principle tells very, very much.

At times it is possible to hear--this is the task of the State Committee for Science and Technology, it directly supervises the complexes. The wording obviously requires refinement. "The methods supervision and coordination of activity" are put down to the committee. Under the conditions of different subordination this is far from a supervisory role in its true understanding. If the State Committee for Science and Technology were a fund holder, a powerful lever would be in its hands. But the resource supply of complexes passes through ministries, which "disarms" the committee.

But what is methods supervision? Documents and once again documents. Proposals on the development of the pilot production bases of interbranch scientific technical complexes have been formulated, but this does not at all mean that the ministries have rushed headlong to build them. Standard legal documents have been prepared, however, the managers of the complexes are not in much of a hurry to put them to use. A method of unified planning, which interconnects science and production, has been drawn up, only for some reason not everyone has yet looked into its points.

In general, the atmosphere, into which the newborn organizations have been plunged, is very complicated. There are more than enough difficulties of growth. But let us imagine the ideal situation: all the musicians are seated in their places, the music has been prepared, a conductor has been found. But will the orchestra begin to play? Is it ready to perform a tune? About this in the next release.

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ACHIEVEMENTS OF ROTOR INTERBRANCH COMPLEX OUTLINED

Moscow EKONOMICHESKAYA GAZETA in Russian No 7, Feb 87 p 6

[Article by Academician L.N. Koshkin, Hero of Socialist Labor and general director of the Rotor Interbranch Scientific Technical Complex, under the rubric "Scientific and Technical Progress: Economics and Management": "Rotor Is Picking Up Speed"; capitalized passages published in boldface; first paragraph is EKONOMICHESKAYA GAZETA introduction]

[Text] The Rotor Interbranch Scientific Technical Complex, of which the design bureau of automatic lines (KBAL) is the main organization, is called upon to expedite the accomplishment of a very important technical and economic task--to increase by many fold (tens of fold!) social labor productivity on the basis of the use of rotary and rotary conveyor lines.

Rotary conveyor lines are machines of a new class, which perform operations in the process of the combined transportation of objects of machining and tools. Their use at enterprises of the chemical, electrical equipment, automotive, and radio industries and the State Agroindustrial Committee has already made it possible to free thousands of people when producing needle bearings, combine chains, aerosol valves, and radio and electrical equipment parts.

The past year already gives grounds to summarize several results of the activity of the interbranch scientific technical complex.

The introduction of rotary lines continues to be expanded at the Lyubertsy Plastics Plant, but already at this stage they have ensured an increase of the output of fiber glass insulators and have made it possible to reject the acquisition of several hundred presses and the construction of a new building.

At the Saratov Bearing Plant by means of our developments the output of products has been increased by several fold with the decrease of the labor intensity to one-fifth.

The use of rotary lines at the Voronezh Plant of Radio Parts freed 1,400 people.

It is also possible to cite other examples of the development and introduction of rotary lines on initiative from below. In all in 1986 we introduced about

150 rotary lines at enterprises of our ministries and more than 50 in other departments.

All this is merely indications of the good changes. An enormous field of activity lies ahead. The duty of the technical supervision of all operations on rotary and rotary conveyor lines both in our country and in the CEMA member countries has been assigned to the Rotor Complex. We have begun the establishment of affiliates of the main organization and have allocated assets for the construction of an educational and fieldwork center and additional laboratory and experimental production facilities at the design bureau of automatic lines and its affiliates. The decision on the construction of a special plant for the production of prototypes of rotary and rotary conveyor lines and their output in small series has been made.

Some results in the accomplishment of other tasks, which have been set for the Rotor Interbranch Scientific Technical Complex, also exist. During the past year, perhaps, the most difficult stage of the formation of affiliates of the design bureau of automatic lines was covered. Premises were allocated for them, managers--directors, chief engineers, and chiefs of the design bureaus--were selected and appointed. The recruitment of designers and process engineers is under way.

In all the organizations included in the Rotor Interbranch Scientific Technical Complex design development has been started, surveys of the supervised sectors of industry and the drawing up of long-range plans are being carried out.

A real, although not yet end result consists in the increase of the number of designs which are being developed outside the design subdivisions of the design bureau of automatic lines. Whereas in 1985 there were less than 10 of them, now there are about 70. This year the question of the production of prototypes of rotary and rotary conveyor lines will become urgent. This is a problem of production bases. That is why we consider it necessary to change one or two machine building plants over to the production of prototypes, having left series output as a reserve load. It is necessary to do everything in order to speed up as much as possible the production of prototypes and to shorten the time to several months.

For the purpose of the further development of production capacities for the assurance of the series production of 140 lines a year the Ministry of the Machine Tool and Tool Building Industry jointly with the USSR State Planning Committee approved a program for the renovation of the Voznesensk Plant of Press Assemblies on the production of high-performance rotary conveyor lines which are intended for the mass production of plastic items.

The construction of the facilities of the Rotor Interbranch Scientific Technical Complex has been entrusted to powerful construction organizations. The oblast party committees have taken under control all questions connected with the formation of affiliates of the design bureau of automatic lines (the allocation of temporary premises and sites for the construction of the production base and housing, the selection of personnel, the establishment of cooperation with industrial enterprises of the regions, and so on). The

Leningrad, Ulyanovsk, Voroshilovgrad, and other oblast party committees are actively performing this work.

Experience has shown how important the mastering by management personnel of ministries and departments and the engineering and technical personnel of enterprises of the basic laws of development of technology and production machines and the need following from them for the transformation of rotary and rotary conveyor lines into the dominant form of production equipment is.

It is gratifying that more and more people are beginning to share and support our ideas. Just recently in the majority of machine building ministries they planned for the 12th Five-Year Plan the introduction of three to five rotary lines. Yet this is not a technical revolution, but a tribute to fashion or a formal response to the appeal.... This psychology had to be surmounted, as a result of which in the past year alone the plans were revised and this figure has already topped 8,000(!).

We are organizing the visiting of works, which are equipped with our lines, and are holding there 2- to 3-hour qualified lectures and interviews. About 3,000 people, who are being trained at the Orekhovo-Zuyevo Plastics Plant, the Podolsk Combine, and other enterprises, are covered today by such work. This is a significant, but, in our opinion, still inadequate portion of the managers who should undergone such training.

In our opinion, it would be useful to use for this purpose the Academy of the National Economy attached to the USSR Council of Ministers, where it is possible to organize permanent courses: about, say, 10 hours of theory plus practical lessons with the showing of advanced equipment.

Another, no less important part of the training of personnel consists in instruction in the skilled designing of rotary and rotary conveyor lines. This task is far more extensive and difficult. It seems to us that there should be 3- to 4-month courses with subsequent fieldwork under the supervision of specialists of the design bureau of automatic lines. Tens of thousands of engineering and technical personnel should undergo such training.

The task of converting to rotary and rotary conveyor lines even that portion of the works, which in the technological level are ready for such a goal, consists in the replacement of millions of operating machines and workplaces, at which 10-12 million people are engaged in manual labor. If we set as a goal to develop rotary lines or rotary conveyor lines for each specific part, hundreds of thousands of lines will be needed. It is impossible to develop such a number in a short time. But there is also no need for this.

Rotary and rotary conveyor machines are intended not for one part or another, the diversity of which is infinitely large, but for PROCESSES. While their number is relatively small--only four classes (the point, linear, surface, and three-dimensional interaction between the tool and the object of machining). In technological processes of the third and fourth classes only 100-200 processes, which require kinematically different types of production machines, will be assembled.

Each kinematic type should differ with respect to a number of parameters (the spacing between the tools, the forward stroke, the number of elements in the rotors). This is approximately 20-30 modifications or versions. Consequently, it is necessary to develop only 2,000-3,000 operating, mainly rotary conveyor machines.

If the task is posed to perform this work in 5 years, it is necessary to have for its accomplishment 30,000-40,000 designers. Consequently, at our design bureau of automatic lines it is necessary to train 1,000 people a year, which would make it possible subsequently to increase sharply the number of specialists by means of the affiliates of the design bureau of automatic lines and the organizations which already have experience in the development of rotary and rotary conveyor lines.

We are actually training only 50-60 people a year only because we have nowhere to accommodate the newcomers. The planned construction will eliminate this problem in 2-3 years. But design specialists of rotary lines are needed today. Therefore, we believe that it is necessary to allocate to the Rotor Complex for a temporary dormitory and educational facilities a finished apartment house with 200-300 apartments, best of all in Moscow, where such facilities are being constructed by the hundreds. This debt will be repaid a hundredfold.

Of course, 1 year for the Rotor Interbranch Scientific Technical Complex is short time, but we believe that the foundations of the machines, which will come to the works in the immediate future and will increase sharply the results of the labor of the Soviet people, have been laid already today.

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POOR WORK OF RSFSR SECTORIAL SCIENTIFIC ORGANIZATIONS

Moscow SOBRANIYE POSTANOVLENIY PRAVITELSTVA ROSSIYSKOY SOVETSKOY FEDERATSII in Russian No 24, 1986 pp 485-488

[Decree No 405 of the RSFSR Council of Ministers of 22 September 1986 "On Serious Shortcomings in the Activity of Several Sectorial Scientific Research and Planning and Design Organization of the RSFSR"]

[Text] The RSFSR Council of Ministers notes that RSFSR ministries and departments have a significant scientific potential. More than 300 scientific institutions and 1,500 design, technical, and economic bureaus, centers and laboratories of the scientific organization of labor, bureaus of scientific and technical information, and other organizations are under their jurisdiction. The number of workers at institutions and organizations of sectorial science comes to more than 130,000, including over 7,500 candidates and doctors of sciences. More than 150 million rubles are allocated annually for the performance of scientific research work alone.

However, as the check made by the RSFSR State Planning Committee, the RSFSR People's Control Committee, and the RSFSR Ministry of Finance showed, the activity of sectorial scientific research and design organizations is inefficient and is not making an appreciable contribution to scientific and technical progress and the retooling of the sectors of the national economy of the republic.

The themes of research and development, which are approved by RSFSR ministries and departments, are not always topical, while are often of neither theoretical nor practical value and are removed from the tasks of modern production.

The RSFSR ministries and departments are poorly enlisting in the solution of production problems the scientists and specialists of the scientific centers of the USSR Academy of Sciences, the Siberian Department of the USSR Academy of Sciences, the All-Russian Department of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin, the Siberian Department of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin, the Department of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin for the Nonchernozem Zone of the RSFSR, the Siberian Department of the USSR Academy of

Medical Sciences, and higher educational institutions of the RSFSR Ministry of Higher and Secondary Specialized Education.

The impact from the introduction of completed developments of many scientific research and planning institutes and design bureaus is low. The economic efficiency from the use of the results of the scientific research of the Central Scientific Research Institute of Consumer Services of the RSFSR Ministry of Consumer Services came in 1985 to 4 kopecks per ruble of expenditures, the Kalinin Affiliate of the All-Union Scientific Research Institute of the Peat Industry of the RSFSR Ministry of the Fuel Industry--33 kopecks. Similar facts exist at the scientific institutions of the RSFSR Ministry of Light Industry, the RSFSR Ministry of the Textile Industry, the RSFSR Ministry of the River Fleet, the RSFSR State Agroindustrial Committee, and other ministries and departments of the republic.

The work with the personnel of institutions of sectorial science requires radical improvement. Scientific research institutes are inadequately manned with competent, resourceful specialists and managers. At the scientific institutions of the RSFSR Ministry of Local Industry, the RSFSR Ministry of Land Reclamation and Water Resources, and the RSFSR Ministry of Highways there is not one doctor of sciences. The available possibilities of the moral and material stimulation of the labor of leading scientists, designers, and process engineers are being poorly used by the RSFSR ministries and departments.

Effective steps on the improvement of the management of sectorial science, the uniting of small and the elimination of inefficiently working institutions and organizations of science and scientific service are not being taken.

At scientific institutions and design bureaus there are many cases of upward distortions and window dressing, violations of staff and estimate discipline and mismanagement, and the diversion of forces and assets for the performance of jobs not characteristic of them.

The serious shortcomings in sectorial science of the republic became possible as a result of the fact that many RSFSR ministries and departments and their executives personally are slowing reforming their work in conformity with the instructions of the June (1985) conference in the CPSU Central Committee on questions of scientific and technical progress and the decisions of the 27th CPSU Congress and are evaluating in a noncritical manner the activity of subordinate scientific and planning organizations.

For the purpose of eliminating the shortcomings in the activity of sectorial scientific research and planning and design organizations and to execute Decree No 686 of the USSR Council of Ministers of 11 June 1986 (SOBRANIYE POSTANOVLENIY PRAVITELSTVA SSSR, No 26, 1986, Article 148) the RSFSR Council of Ministers resolves:

1. The executives of RSFSR ministries and departments:

--are to take exhaustive steps on the acceleration of the reorganization of sectorial science in conformity with the decisions of the 27th CPSU Congress

and to ensure the decisive improvement of the work of scientific research and planning and design organizations, having directed particular attention to the selection and placement of scientists and management personnel;

--are to increase the responsibility of the collegiums and central staff of ministries and departments and the executives of sectorial science for the state of scientific and technical progress in the sector and to strive for the increase of the level and efficiency of research and development and the shortening of the time of their introduction in production;

--are to enlist more actively the scientists and specialists of the scientific centers of the USSR Academy of Sciences, the Siberian Department of the USSR Academy of Sciences, the All-Russian Department of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin, the Siberian Department of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin, the Department of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin for the Nonchernozem Zone of the RSFSR, the Siberian Department of the USSR Academy of Medical Sciences, and the higher educational institutions of the RSFSR Ministry of Higher and Secondary Specialized Education for the elaboration of important sectorial problems, which require the conducting of basic and applied scientific research.

2-3. (Footnote 1) (Paragraphs 2, 3 are not cited as they contain one-time assignments)

4. The RSFSR State Planning Committee and the RSFSR Ministry of Finance are to increase the demandingness when considering the requests of RSFSR ministries and departments on the organization of new scientific research institutes and not to allow the submitting to the RSFSR Council of Ministers of such proposals without sufficiently weighty grounds.

The RSFSR Ministry of Finance is to tighten up the monitoring of the efficient expenditure of the allocated assets by scientific research institutions and organizations.

5. To condemn the practice of using scientific institutions as subdivisions of the management staff and not to permit the fulfillment by them of uncharacteristic jobs.

The RSFSR Ministry of the Textile Industry and the RSFSR Ministry of Light Industry are to eliminate at the Central Planning, Design, and Technology Bureau of the Textile Industry and at the Central Planning, Design, and Technology Bureau of Light Industry the divisions which perform the functions of the management staff of these ministries.

The RSFSR Ministry of Consumer Services is to radically organize the activity of technical and economic bureaus and to ensure the reduction of their staff.

6. To direct the attention of the RSFSR Ministry of Motor Transport, the RSFSR Ministry of Light Industry, the RSFSR Ministry of Land Reclamation and Water Resources, the RSFSR Ministry of the Fish Industry, the RSFSR Ministry of the Textile Industry, the RSFSR Ministry of Consumer Services, the RSFSR

Ministry of Housing and Municipal Services, the RSFSR Ministry of Local Industry, the RSFSR Ministry of the Fuel Industry, and the RSFSR State Agroindustrial Committee to the existence of serious shortcomings in the activity of subordinate scientific research and planning and design organizations and in their management and to require the taking of immediate steps on the elimination of the existing shortcomings.

[Signed] Chairman of the RSFSR Council of Ministers V. Vorotnikov

Administrator of Affairs of the RSFSR Council of Ministers I. Zarubin

Moscow, 22 September 1986. No 405.

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FINANCING, STIMULATION OF INTRODUCTION OF NEW EQUIPMENT

Moscow FINANSY SSSR in Russian No 10, Oct 86 pp 30-34

[Article by Candidate of Economic Sciences M.A. Lupachev, chief of a sector of the Scientific Research Institute of Finance, under the rubric "Finances and the Acceleration of Scientific and Technical Progress": "The Financing and Stimulation of the Introduction of New Equipment Under the Conditions of the Broadening of the Economic Independence of Enterprises"]

[Text] In the Policy Report of the CPSU Central Committee to the 27th party congress it was noted that scientific and technical progress and the radical transformation of the productive forces of society act as the main means of the changeover to an economy of the greatest organization and efficiency. The changeover of the national economy to the intensive means of development requires changes in the entire economic mechanism, particularly in the system of financial methods of influencing the process of the introduction of technical innovations in production. Financial levers and stimuli should become a more effective means which ensures the increase of production efficiency on the basis of the introduction of new equipment.

In recent years an increase of the effectiveness of implemented scientific and technical measures has been observed. Thus, the amount of the additional profit from the introduction of new equipment per ruble of expenditures and per scientific and technical measure has increased. The positive changes in this direction stem from the steps being implemented in the country on the strengthening of the influence of economic levers and stimuli on the acceleration of the pace of scientific and technical progress and the increase of the efficiency of the equipment being introduced. However, it is premature to be content with the obtained results. Considerable reserves exist in the arsenal of means of the stimulation of the activity of enterprises and scientific and technical organizations in the increase of the efficiency of the elaboration and assimilation of new technical solutions, which make it possible to increase significantly the qualitative level of production and the output being produced.

The financing of scientific and technical progress includes a set of directions. In the most general form these expenditures can be divided into three large groups. The first is the expenditures connected with the financing of basic research, the second is the expenditures on scientific

research, planning, and experimental design operations, the third is the expenditures on the introduction of new equipment, including the offsetting of the increased expenditures during the 1st year of assimilation. Depending on the functional purpose of each type of expenditures the sources of their financing are also depending. Basic research is financed primarily at the expense of the state budget, research and development are financed at the expense of several sources: the unified fund for the development of science and technology; allocations from the budget; the assets which are envisaged for scientific research work in the plans of the production cost of industrial products, construction and installation work, and transportation, as well as in the estimates for construction; the assets from the sale of products which are produced at the pilot facilities and enterprises of scientific research institutions. The expenditures on the introduction of new equipment are made at the expense of centralized capital investments, the production development fund (FRP), the fund for the assimilation of new equipment, the unified fund for the development of science and technology, loans of the State Bank and the All-Union Bank for Financing Capital Investments, budget allocations, and other sources.

Thus, the structure of these expenditures is quite branched. Depending on the stages and cycles of scientific and technical progress the sources of its financing also change. Their overall orientation is characterized by the change of the structure of the sources of financing from nonreturnable state allocations for the development of basic research to the use of internal and borrowed assets at the stages of the drafting of planning documents and especially the introduction of technical innovations in economic practice. The greatest difficulties arise, as a rule, at the stage of the implementation of scientific and technical solutions in production. Here the structure of the sources of financing are closely connected with cost accounting. However, this connection for the present does not fully satisfy the cost accounting requirements. The formed structure of the expenditures, which are allocated for the introduction of new equipment, needs further improvement (see the table).

(percent)

	1980	1981	1982	1983	1984
Expenditures on introduction--total.....	100.0	100.0	100.0	100.0	100.0
including:					
production development fund.....	30.5	28.3	26.4	31.8	32.2
fund for the assimilation of new equipment.....	8.9	11.0	6.3	5.3	6.4
unified fund for the development of science and technology.....	14.0	13.5	17.4	12.4	11.1
state budget.....	3.6	4.8	1.8	2.5	2.9
other sources.....	32.3	31.1	35.7	37.8	35.4

In the past decade substantial changes have occurred both in the absolute amounts of the assets being channeled into the introduction of new equipment and in the structure of the sources of their financing. As a whole the amount of financing of new equipment increased by 1.7-fold. Here the share of the

production development fund in the total amount of expenditures on new equipment increased by 1.5-fold and of the unified fund for the development of science and technology--by 4.6-fold. At the same time the proportion of the fund for the assimilation of new equipment and bank loans decreased (with negligible changes in the proportion of budget allocations).

The basic purpose of the system of financing of the introduction of new equipment consists in the assurance of the formation and use of the necessary monetary resources for the covering of the expenses connected with the production of this equipment or advanced technology. It should create the conditions for the continuous development of production and the increase of its technical level, which is feasible only if in the structure of the expenditures on the introduction of advanced equipment the sources, which by their content and special purpose correspond to the tasks of the increase of the technical level, hold the leading place. On this level the increase of the share of the production development fund and the unified fund for the development of science and technology in the total amount of expenditures on the assimilation of advanced equipment is, undoubtedly, a positive feature.

The unified fund for the development of science and technology was created for the assurance of the comprehensive financing of the entire "research-production" cycle. In the past decade the assets of this fund have increased by nearly eightfold. However, as practical experience has shown, certain shortcomings came to light in the process of using the unified fund for the development of science and technology. Among them is the inadequate substantiation of the principles of the formation of this fund and the use of its assets at all level of management of industry. Thus far there is no sufficiently objective criterion of the necessary size of the unified fund for the development of science and technology, while the formation of the standards of its determination is based on indicators which do not fully reflect the end results of scientific and technical progress.

The formation of the unified fund for the development of science and technology depends, as a rule, on the volume of production of output by production associations and enterprises of the sectors of industry as a whole. The standards of the deductions from the profit for this fund are established in different ministries in different ways. They are specified as a percentage of the planned volume of production of output in accordance with the indicator of the standard net output, of the volume of production of commodity output to the planned volume of sold output, and of the amount of the annual planned profit. It should be noted that an economically sound size of the unified fund for the development of science and technology is not established by production associations and enterprises. The prevailing sectorial instructions on its formation and use make it possible to specify only the standard at the level of the sector.

The analysis of the practice of financing the introduction of new equipment shows that the unified fund for the development of science and technology (in the form in which it is now used) cannot be a reliable source of the support of this process. First, this fund makes it possible to solve primarily the problems of scientific and technical progress at the sectorial level, since its assets are centralized by the ministries. Second, the absolute amounts of

assets of the unified fund for the development of science and technology, which are transferred by ministries to associations and enterprises, are not substantiated scientifically and do not depend on the needs of the latter for the technical improvement of production. Third, the structure of the use of the assets of the fund at present is forming unfavorably with respect to the process of introducing the achievements of scientific and technical progress: significantly more of its assets are being spent on research than on the assimilation of the obtained results at production associations and enterprises.

Under such conditions the enterprises' and associations' own sources acquire decisive importance in the process of financing the introduction of scientific and technical innovations. The production development fund is the largest of them. This is explained not only by the fact that the production development fund is a major source of financing of the expenditures on the development and technical improvement of production, but also by the fact that it is linked more than other sources with the end results of the financial and economic activity of associations and enterprises.

The assets of the production development fund and the unified fund for the development of science and technology have a special purpose. However, in a number of cases the duplication of the functions performed by them occurs: for example, assets from both the production development fund and the unified fund for the development of science and technology are spent on the offsetting of the increased expenditures, which are connected with the implementation of measures which are aimed at the raising of the technical level of units, installations, and new equipment, the mechanization and automation of production processes, and the modernization of operating equipment.

Obviously, the time has come to change somewhat the structure of the sources of financing of new equipment, in connection with which the question of what are called "other sources" should be examined. In the past 10 years their share in the total amount of financing of the introduction of new equipment has increased by more than twofold. It is impossible to recognize such a situation as satisfactory. At times associations and enterprises attribute the expenditures on the assimilation of technical innovations to individual items of the production cost and use the assets which are envisaged in accordance with the estimate of expenditures on invention, efficiency promotion, and others. Thus, a significant portion of the financial resources, which is used for the introduction of scientific achievements, is formed at the expense of numerous minor sources which, as a rule, have a special purpose. This creates confusion in the use of some assets or others and in a number of cases leads to the violation of financial discipline, since enterprises are spending the assets of special-purpose funds not for their immediate purpose.

The question of the optimum ratio of the sources of financing of the introduction of new equipment is quite complex. The structure of financing in many respects depends on the overall conception of planning. Under the conditions, when the latter was based on the detailing of the process of developing and introducing new equipment, when from the unified process its individual components were singled out, the need for such disunited financing,

of course, arose. With the increase of the independence and responsibility of enterprises for the results of their activity and the orientation toward the end economic results the need for such financing is disappearing. The structure of the sources of financing of new equipment can be simplified substantially. For this it makes sense to unite the disunited sources of financing of the introduction of new equipment in a single fund, of which the production development fund would constitute the base.

The insufficiently complete materialization of scientific ideas to a significant extent is explained by the poor material interest of associations and enterprises in the assimilation of new equipment. Assimilation is the final stage of the "science-technology-production" cycle, when new technical solutions, which are capable of radically changing the nature of production, are implemented. At the same time assimilation is also the most complicated stage of the science-technology cycle. Experience shows that the more advanced the equipment being introduced is and the greater the degree of its novelty is, the more difficulties arise.

The assimilation of technical innovations requires, as a rule, increased production costs as compared with the product being replaced, as a result of which the indicators of economic activity worsen. This is why the majority of enterprises unwillingly agree to the production of new equipment. Such a position of theirs under the formed conditions is explicable. The trail blazing enterprises, which assimilate the production of technical innovations, in case of failure risk worsening their economic position. But even in case of successful assimilation their gain will be extremely negligible. If you weigh the troubles and advantages, which the assimilation of a scientific and technical innovation can bring, the scale in the overwhelming majority of cases will tip toward the rejection of the production of new equipment. The negative reaction of production to innovations and the small proportion of advanced equipment in the total volume of the output being produced are also explained primarily by this.

Under the conditions of cost account the profitability of economic activity, which determines the advantageousness of the production of one type of equipment or another, acts as a form of expression of economic interests. Here the mechanism of the pricing of new equipment is of considerable importance. In recent years a number of measures on the improvement of the determination of wholesale prices and the establishment of stimulating markups on highly efficient products have been implemented in the area of pricing. But far from all the questions have found their resolution. Many aspects require further specification, and in several cases complete revision.

The stimulating function of the price is connected with the efficiency of advanced equipment. This means that the prices, in performing the function of a stimulant of the acceleration of scientific and technical progress, should conform to the interests both of the national economy and of the producer and user of the new equipment. In economic literature there is often voiced the opinion that a scientifically sound price for new equipment should be established with allowance made for the economic impact, which its production and use in the national economy yield. In this case such a calculation of the economic impact, which would make it possible with great reliability to

reflect the influence of the results of the use in production of scientific and technical developments on the indicators of economic activity, is necessary for the performance by the price of its functions. It is impossible to say this about the prevailing procedural instructions on the determination of the economic impact of new equipment. (Footnote 1) ("Metodika (Osnovnyye polozheniya) opredeleniya ekonomicheskoy effektivnosti ispolzovaniya v narodnom khozyaystve novoy tekhnike, izobreteniy i ratsionalizatorskikh predlozheniy" [The Method (Basic Principles) of Determining the Economic Efficiency of the Use in the National Economy of New Equipment, Inventions, and Efficiency Proposals], Moscow, Ekonomika, 1977) The so-called national economic impact of new equipment is calculated in conformity with them.

In recent years a number of critical remarks have been expressed in economic literature with regard to the economic content of the formulas of the determination of the national economic impact of new equipment. There is no point in repeating them, let us merely note the following. The method of determining the impact of new equipment was formulated on the basis of the hypothetical conditions of its use and does not take into account the adjustments made by practice. The calculation of the impact is based on a number of conditional accounting indicators, which do not find reflection in the results of cost accounting activity. The attempts to use the named indicator and to reflect it in the economic results were not successful. In the indicator of the national economic impact the real efficiency of new equipment usually was significantly overstated. A situation formed, in case of which in accordance with the calculations in conformity with the prevailing method a significant economic impact had been obtained, but in practice it did not appear. Thus, it simply did not exist.

Consequently, the orientation toward the mentioned indicator and the formation of systems of pricing and material incentives subject to its value are not justified. The practice of using calculations of the national economic impact in cost accounting activity confirmed their incompatibility. However, this indicator is widespread, while the procedural principles of its determination are being used in case of the simulation of the prices for new equipment and the checking of their validity. This is leading to negative results, which are expressed by the lead of the increase of the prices for new equipment as compared with the improvement of its consumer properties.

The orientation of pricing toward the amount of the economic impact is leading to the unjustified increase of prices. In economic literature there are many examples which confirm this. Let us cite one of them. (Footnote 2) (See L.I. Razenova, "Tsena i novaya tekhnika" [The Price and New Equipment], Moscow, Ekonomika, 1985, p 101) When designing the Kristall 109 unit the Ministry of the Electrical Equipment Industry submitted for registration to the USSR State Committee for Prices a limit price in the amount of 185,000 rubles. When comparing the unit being designed with similar operating ones it was established that the increase of expenditures leads the increase of the consumer properties, which in turn leads to the inadequate efficiency of the new equipment. In this connection the USSR State Committee for Prices returned for modification the materials on the registration of the limit price. After additional analysis the limit price, but now 100,000 rubles,

which was also registered, was resubmitted. The ministry received the right to organize the series production of the new units.

The cited example characterizes quite eloquently the quality of the limit price. If the developers considered it possible to reduce it to nearly one-half, doubts about its validity arise. It is not ruled out that in this case it was possible to establish the limit price at the level of 70,000 rubles or 90,000 rubles. This example also attests to something else. On the one hand, it testifies to the aspiration of enterprises to overstate the price and, on the other, to the lack of an economic mechanism of the control of prices. It turns out that the determination of the price depends on the members of the staff of the USSR State Committee for Prices. Of course, it is difficult to check in detail the calculations on the range of many thousands of types of new equipment being assimilated, obviously, that is why a price, which does not correspond to its consumer properties, is established for a specific portion of it.

Under these conditions the need for the establishment of a self-regulating mechanism of the control of prices arises. This assumption already has practical implementation in the form of contract prices. The more extensive use of the latter follows directly from the measures being implemented in the country on the broadening of the rights of production enterprises and associations. This measure should become an important element of the strengthening of cost accounting relations.

The material interest of the workers of scientific and technical organizations, production enterprises, and associations is one of the main directions of the stimulation of the introduction of new equipment and the increase of its efficiency. At present a number of systems of material stimulation, which were developed at different times, are in effect in industry. The material rewarding of the immediate performers of measures on the introduction of the achievements of scientific and technical progress is carried out at the expense of the material incentive fund, the fund for the payment of bonuses for the development and introduction of new equipment and technology and complete mechanization and automation, the fund for the payment of bonuses for the delivery of products for export, the fund for the development and introduction of new types of items, as well as the assets which are intended for the material stimulation of inventors and efficiency experts.

It seems that such a multiplicity of sources of incentives leads to the obliteration of the functional differences of the stimulation funds of scientific and technical progress. For, in addition to the incentive funds listed above, a large number of sources of material incentives exist simultaneously in industry. These are, for example, the funds for the payment of bonuses for the saving of fuel, electric power, and thermal energy, for the collection, delivery, and shipment of ferrous and nonferrous metal scrap and waste, and for the delivery of food scraps and the assets for the payment of bonuses for the creation of a material interest in the economical consumption of the type of material resources, which is important for each sector.

At a specific stage the formation of special-purpose stimulation funds contributed to the increase of the interest in the performance of operations, for which a reward was paid. But the development of the system of stimulation in this direction also revealed negative aspects. The multiplicity of sources of stimulation disperses the attention on individual questions of economic activity, under today's conditions this is becoming a hindrance in stimulation for the end results and is making the giving of incentives cumbersome and in a number of cases hard to manage. That is why the substantial reduction of the sources of material incentives and their reorientation toward the settlement of basic economic and production questions are an urgent necessity. On this level the interaction between the system of stimulation for the basic economic results and the specialized system of stimulation for new equipment is acquiring considerable importance.

The specialized systems for a number of years were of dominant importance in the influencing of the introduction of advanced equipment. However, their effectiveness proved to be inadequate. These systems operate, as a rule, in isolation from the basic economic mechanism and are linked extremely weakly with the interests of collectives of enterprises. The orientation toward the achievement of the conditional accounting indicators, which far from always express the real increase of production efficiency, is another shortcoming of them.

The economic mechanism and its individual subsystems should satisfy the conditions of intensive development. But the latter is possible only when the economic interests of the enterprise have been made dependent on the increase of the real efficiency, which it is possible to achieve only by the increase of the technical level of production and the output of high-quality products. The developments in this area reduced in recent times mainly to attempts to stimulate individual aspects of the production activity of enterprises and associations.

Here the improvement of the basic economic mechanism of the management of the national economy was lost sight of. However, precisely the basic economic mechanism has a decisive influence on the interests of production collectives. Therefore, the further stimulation of activity in the acceleration of scientific and technical progress should be aimed in the direction of the extension of cost accounting and the improvement of pricing, financing, and the remuneration of labor. The questions of strengthening the influence of scientific and technical progress on the increase of production efficiency should be examined through the prism of these directions.

The opinion that if better conditions as compared with others are not created for the enterprise, it will not introduce new equipment, has taken root in economic literature and in economic practice. The very raising of the question attests to the passive role of the enterprise in the process of its introduction. Such a role was assigned to it by the system of management of the economy, which had been in effect. Now the situation is changing radically. The epicenter of economic life is shifting directly to production enterprises and associations. The results of economic activity mainly depend on the labor collectives themselves.

For the strengthening of the influence on the process of the introduction of new equipment and technology and the increase of the return from the use of new technical solutions substantial changes in the entire economic mechanism, the main one of which is to interest enterprises in the use of this equipment and advanced technologies and materials, are necessary. The further implementation of measures on the increase of the economic independence of production associations and enterprises will increase substantially the interest of enterprises in the introduction of new equipment. Therefore, the changeover of enterprises to self-financing should be expedited. For its successful realization it is necessary to implement a number of measures on the change of the procedure of the distribution of the profit of enterprises and their interrelations with the state budget.

At present the conditions exist for the changeover of enterprises to the standardized method of distributing the profit, in case of which stable deductions to the budget are established, while the remainder of the profit is left at their disposal. Such an approach could actually provide the conditions for the changeover to complete self-financing and create an interest in the decrease of the level of production costs and the use of new technical solutions. However, it is possible to obtain the anticipated result from the changeover to this system only in case of the simultaneous implementation of a set of measures on the improvement of the entire economic mechanism, first of all the procedure of planning, the distribution of material and technical resources, and the strengthening of contractual relations in economic activity.

The realization of the principles, which were advanced at the 27th party congress, requires the radical change of the procedure of planning and managing the economy. The radical reform of management consists in the fact that cost accounting enterprises and organizations will carry out activity entirely on the basis of the principles of self-financing. They will independently form their file of orders with allowance made for the existing possibilities, the study of the demand for the product being produced, and the suggestions on the part of developers. Such an approach will make it possible to solve a number of urgent economic problems. The very fact of the complete changeover to self-financing creates a reliable basis for the balance of commodity and monetary resources. Under these conditions the amount of the monetary revenues, which are distributed among the members of labor collectives, will depend on the volume of output, which in its qualitative characteristics satisfies the requirements of the buyer. In turn this will stimulate enterprises to seek interest reserves of the increase of the output of products and the improvement of their quality.

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DIRECTIONS OF DEVELOPMENT OF MOLDAVIAN SCIENCE

Kishinev KOMMUNIST MOLDAVIA in Russian No 9, 1986 pp 18-24

[Article by Academician of the Moldavian SSR Academy of Sciences A. Ursul: "Science at a Sharp Turning Point"; capitalized passages published in boldface]

[Text] At the 27th CPSU Congress the policy of the acceleration of the socioeconomic development of the country and the securing of peace on earth and in space was confirmed and underwent further development. In 15 years we have to do as much as was done during the entire preceding period from the moment of the accomplishment of the Great October Socialist Revolution. "On the paths of scientific and technical progress," General Secretary of the CPSU Central Committee M.S. Gorbachev emphasized in a speech at a meeting with workers of the city of Togliatti, "the production potential has to be doubled and labor productivity has to be increased by 2.3- to 2.5-fold in order on this basis to increase the well-being of the people to a new level, having allocated here twofold more resources than we are now allocating."

The implementation of the strategic policy of the party of accelerating socioeconomic progress is based upon the use of the achievements of the scientific and technical revolution and presumes the resolute and large-scale turn of science toward the needs of the country. It is called upon to play the role of an intensifying factor of the development of production and other spheres of social activity. Thereby science as an immediate productive force acts as a whole as a catalyst of socioeconomic development. Along with this, to a certain degree external function of acceleration science should itself be developed intensively. This process began back at the times of Copernicus. Since that time, F. Engels noted, "the development of science has taken giant strides, speeding up, so to speak, in proportion to the square of the distance in time from its starting point, as if wishing to show the world that with respect to the movement of the pick of organic matter, the human spirit, a law, which is the inverse of the law of the movement of inorganic matter, is in force" (K. Marx and F. Engels, "Soch." [Works], Vol 20, p 509).

Scientists of science have now confirmed the law of the acceleration of the development of science, which was formulated by F. Engels. It is also in effect at present, but its difference from the preceding stage consists in the fact that the process is occurring no longer on an extensive basis. The

utmost intensification of science and its contacts with the national economy is also the basis of its rapid development at the present stage. This is the automation of research on the basis of the extensive use of computers, the development of automated support systems, and the efficient use and modernization of the instrument making base and other information and technical factors. This is new effective social levers, first of all of the economic stimulation, planning, and management of scientific and technical progress. This is new experimental and theoretical, especially mathematical, means of research.

The strategy of the further rapid movement of Soviet science along the path of social progress is oriented precisely toward its further intensive development. "PARTY POLICY IN THE FIELD OF SCIENCE," it is stated in the new version of the CPSU Program, "IS AIMED AT THE CREATION OF FAVORABLE CONDITIONS FOR THE DYNAMIC PROGRESS OF ALL FIELDS OF KNOWLEDGE AND THE CONCENTRATION OF PERSONNEL AND MATERIAL AND FINANCIAL RESOURCES IN THE MOST PROMISING DIRECTIONS, WHICH ARE CALLED UPON TO SPEED UP THE ACHIEVEMENT OF THE OUTLINED ECONOMIC AND SOCIAL GOALS AND THE SPIRITUAL DEVELOPMENT OF SOCIETY AND TO ENSURE THE RELIABLE DEFENSIVE CAPABILITY OF THE COUNTRY." Party policy in this area is the strategy of the acceleration of its development, the more and more complete return of science to society, and its attainment of qualitatively new levels.

Owing to the constant attention and supervision of the party and government science of Moldavia has all the necessary conditions for the fulfillment of the tasks set for scientists. At present 53 scientific research institutes and 9 higher educational institutions are in operation in the republic, moreover, in 1985 the number of scientists came to about 9,800, including 320 doctors and more than 4,000 candidates of sciences. More than 1,200 scientists work at the Moldavian SSR Academy of Sciences alone. Among them are 23 academicians and 25 corresponding members of the Moldavian SSR Academy of Sciences and more than 100 doctors and 750 candidates of sciences. The republic Academy of Sciences during the 11th Five-Year Plan introduced more than 800 jobs, which is twofold more as compared with the 10th Five-Year Plan. The actual economic impact from this introduction came to 352 million rubles, which is threefold more than during the 10th Five-Year Plan. In the same year the coefficient of economic efficiency for the Moldavian SSR Academy of Sciences came to 3.41 rubles per ruble of expenditures. The expenditures on science in the republic came to more than 31 million rubles, while the fixed capital came to about 100 million rubles.

More than half of the scientists of our republic work at higher educational institutions, they are actively participating in the solution of republic and union scientific and technical problems, annually introducing in the national economy more than 200 innovations. In the system of the Ministry of Higher and Secondary Specialized Education alone, where more than 3,000 science teachers (including 81 doctors and 1,370 candidates of sciences) are concentrated, during the 11th Five-Year Plan more than 460 completed works were introduced with an economic impact of 40 million rubles.

A large portion of the scientific research institutions and higher educational institutions of Moldavia are concentrated in Kishinev, and it is quite natural

that they are giving our city significant assistance. Thus, scientists of the academy alone during the past five-year plan implemented more than 70 developments at enterprises and organizations of the capital, among which are the Moldavgidromash, Moldsakharprom, and Moloko production associations, the tractor plant, the Sewing Factory imeni XXIII syezda KPSS, and others. Much work was performed by social scientists on the drafting of the Comprehensive Plan of Economic and Social Development of the City for 1981-1985, which for the most part was implemented. The recommendations of sociologists are being used extensively at the Vibropribor Plant of the Volna Production Association imeni K.U. Chernenko, the bread combine, the Styaua Roshiye Knitwear Production Association, and others.

The Institute of Mathematics of the Moldavian SSR Academy of Sciences developed special models and programs of calculations on a computer, the use of which is making it possible to improve the characteristics of the instruments being developed at the Volna Production Association and the quality of items at the Schetmash Plant. The technology, which was developed at the Institute of Applied Physics of the Moldavian SSR Academy of Sciences, is being used at the Mezon Plant.

The research in the area of seismology, which is being conducted at the Institute of Geophysics and Geology, as well as of hydrogeologists, who have established the basic trends of change of the underground hydrosphere on the territory of Kishinev, is aimed at the increase of the quality of the buildings being erected.

It is also possible to further cite examples of the fruitful integration of science and production, however, it is necessary to note that they are for the present isolated--introduction is not yet of a large-scale and massive nature. The scientific potential of the republic, as was emphasized at the 16th Moldavian CP Congress, is being used unsatisfactorily. After all, throughout the five-year plan the plans of the development of science and technology in the national economy were not fulfilled. The inadequate coordination of the work of academic, sectorial, and VUZ science is also occurring.

The problem of the introduction and use of academic and sectorial science is arousing particular anxiety. For, as was noted at the 16th Moldavian CP Congress, "about half of the completed scientific research developments are finding application only at individual enterprises, the results of scientific developments, which are of an intersectorial nature, are being introduced poorly. In practice only 1 invention in 10 is being used. The responsibility of executives of ministries and departments, enterprises and associations for the introduction of the achievements of science and technology and advanced know-how in the sectors of the national economy and for the backing of the fulfillment of the plan assignments on science and technology with the necessary raw material, material, and technical resources has been lowered." The task of implementing a set of measures on the development and practical use of the achievements of modern science and technology was posed at the congress.

It is envisaged to allocate more than 351 million rubles, or 26 percent more than during the 11th Five-Year Plan, for research and development and the

strengthening of the material, technical, and pilot experimental base of scientific institutions. The development of a biological complex of the Moldavian SSR Academy of Sciences and the placement into operation of the scientific production complex of the Kordu Scientific Production Association are planned. The construction of the republic pilot experimental enterprise of robotics and machine building and other facilities will be started. At enterprises and farms it is planned to implement about 700 basic scientific and technical measures. The economic impact from their introduction should come to 410 million rubles, while the saving of materials and fuel and energy resources should come to more than 42 million rubles. It is planned to reduce to one-third the amounts of use of difficult physical labor and to completely eliminate the difficult physical labor of women. As First Secretary of the Moldavian CP Central Committee S.K. Grossu noted, for the successful fulfillment of these tasks, the pursuit of a unified science and technology policy, the increase of party influence on the development of science and technology, and the speeding up of the introduction of their achievements in the national economy in the republic, following the example of the Ukrainian SSR, Leningrad, and other oblasts, councils for the promotion of the acceleration of scientific and technical progress have been established under the Moldavian CP Central Committee and the city and rayon party committees.

The priority of basic fundamental research is an indispensable condition of the rapid intensification of science. In the Moldavian SSR research is being conducted in the most important directions of modern science, including in the field of theoretical mathematics and physics, coordinate, quantum, and bioorganic chemistry, geophysics and geology, geography, ecological genetics, physiology and biochemistry, botany and zoology, microbiology, economics, history, archaeology, philosophy, sociology, law, philology, ethnography, and art criticism. Among the new directions, which have begun to be developed rapidly in the republic, particularly at the Moldavian SSR Academy of Sciences, are ecological genetics, ecology, including social ecology, information science, microelectronics, econology, philosophical questions of natural science, and others.

At present, when science is at a new stage of its development, the concentration of the potential of academic, VUZ, and sectorial science on the choice of the priority directions, which make it possible to speed up significantly the changeover of the national economy to the intensive means of development and to achieve a new level of efficiency, is acquiring particular importance for the implementation of the tasks posed by the party. And in this connection the research, which presumes their large-scale and rapid introduction in production, is acquiring particular significance. For Moldavia first of all the problems of the agroindustrial complex are very urgent. As was emphasized in the report of Chairman of the Moldavian SSR Council of Ministers I.P. Kalin at the 16th Moldavian CP Congress, here the efforts of scientists, and first of all of sectorial science, are aimed at the development of high-yielding strains of agricultural crops, which are resistant to pests and diseases, the development of highly efficient industrial technologies, methods of the selection, breeding, and development of new breeds and lines of agricultural animals and poultry and the improvement of existing ones, new forms and technical methods of carrying out breeding, and technologies of the housing of animals, the development of

methods of the increase of the productivity of soils, the efficient use, and conservation of water and timber resources.

In this connection the further development and introduction of an adaptive system of the intensification of agricultural production, which is aimed at the extensive use of biological and other natural factors in their fundamental combination with technical and socioeconomic factors of intensification, is acquiring particular importance. The development of the adaptive intensification of the agrosphere is an important step in the direction of the changeover of the agroindustrial complex to the path of comprehensive intensification, which ensures the increase of its efficiency and stability, nature conservation, and the decrease of the consumption of nonrenewable energy. It seems that these important peculiarities of the adaptive system of intensification, which is now being developed, merit the analysis in their light also of the development of industry and other types of social activity. The new version of the CPSU Program is also aimed precisely at this.

As is known, the party is assigning a key role in the materialization of the latest achievements of science and technology to the rapid development of machine building. Of its sectors there are by right considered as the catalysts of the acceleration of scientific and technical progress of the republic: microelectronics, computer technology, remote control and video engineering, means of the robotization of production, and the entire information science industry. They are also receiving priority in development.

An important role in the acceleration of scientific and technical progress is being assigned to scientists who work at higher educational institutions. In the Policy Report of the CPSU Central Committee to the 27th party congress it was noted that for the country as a whole more than 35 percent of the science teachers, including about half of the doctors of sciences, are concentrated here, but they perform not more than 10 percent of the scientific research. The decision to increase substantially the scale of research and development, which are conducted by higher educational institutions, was adopted at the meeting of the Politburo of the CPSU Central Committee, which was held on 10 April 1986.

In accomplishing the tasks outlined by the party, it is important to concentrate attention on such general questions of the acceleration of scientific and technical progress as the increase of labor productivity, production efficiency, and product quality, which are the most important indicators of the changeover to the intensive, rapid means of development. For during the 12th Five-Year Plan it is planned in the republic to provide not less than two-thirds of the increase of labor productivity (and the total increase will come to 4.6 percent) by means of the introduction of the achievements of science and technology, which corresponds to the conditional freeing of about 140,000 workers. Given the average annual increase of the national income of the republic by 4.9 percent, its materials-output ratio should be reduced by 5.5 percent, while its power-output ratio should be reduced by more than 10 percent. The production of industrial products of the highest quality category has to be doubled.

It is now important to change those forms of production relations, which have ceased to stimulate productive forces and which have led not to the acceleration of socioeconomic development, but to its slowing and to the appearance of the effect of adverse trends which have slowed our progress. It is important with the aid of science, and first of all economic science, to aim the entire economic mechanism at the achievement of high-quality parameters of products and production and the surmounting of its expenditure nature. And in this connection a task of particular importance for the acceleration of scientific and technical progress is to improve planning radically by directing attention to the end results and the extensive introduction in all sectors of the national economy of the latest technical achievements. The section of the plan of economic and social development on science and technology should, as was noted at the 16th Moldavian CP Congress, become a fundamental component, the basis of the sections of the plan on production and capital investments, and ministries and enterprises should bear strict responsibility for its fulfillment.

The concept of acceleration, which was advanced by the party, is not only an important creative achievement of Marxist-Leninist theory, but also a stimulus for the new stage of the development of economic science and other fields of social knowledge. "The many-sided tasks of acceleration and its interconnected aspects--political, economic, scientific and technical, social, cultural and spiritual, and psychological," M.S. Gorbachev emphasized in the Policy Report of the CPSU Central Committee, "need further thorough and comprehensive analysis. We are experiencing an urgent need for serious philosophical generalizations, sound economic and social forecasts, and in-depth historical research." Further M.S. Gorbachev noted that the social sciences are in a state of being distant from the requirements of life. And that the times are posing the question of a broad outlet of the social sciences to the specific needs of practice, so that social scientists would react sensitively to the changes occurring in life, would keep new phenomena in their field of view, and would draw conclusions which are capable of correctly orienting practice.

The creative intellectual atmosphere, which has now formed, requires that social science thought would be aimed at the solution of urgent problems and at the search for ways and means of accelerating the development of the country. At the present stage it is important to ensure a fundamental turn from the tradition of establishing social phenomena and processes, which prevails at present, to the identification of their laws and the issuing of sound recommendations and forecasts. It is necessary to eliminate resolutely such shortcomings, which are repeatedly noted in the works of social scientists of the republic (and in the country as a whole), as descriptiveness, the popularization of well-known principles instead of truly scientific research, a strong emphasis on the study of the past, work on minor themes, the small number of debates and discussions on urgent problems, the inadequately high quality of a significant portion of the printed matter being published, the predominance of extensive factors in the activity of institutions and subdivisions of social scientists, the low efficiency of introducing activity, and so on. In fulfilling the decisions of the 27th CPSU Congress and the 16th Moldavian CP Congress, social scientists need to place at the center of their work during the current five-year plan the fundamental

tasks in the matter of the acceleration of the development of our society and its achievement of a new qualitative state and to achieve the prompt response of the social sciences to the needs of life and the elaboration of sound and constructive recommendations for practice. "They," it was stated in the Accountability Report of the Moldavian CP Central Committee to the 16th congress, "are called upon to change over from general evaluations of some aspects or others of the spiritual life and the socioeconomic development of the republic to the forecasting of social processes and trends, to come forth with practical recommendations, which would aid in the solution of the problems of the stimulation of the human factor, give effective assistance to the propaganda aktiv in the mastering of the methods of educational work, and to resolutely rebuff modern bourgeois ideology."

Fundamental works, which are written on the basis of an interdisciplinary, comprehensive approach and are prepared by the Moldavian SSR Academy of Sciences jointly with the chairs of social sciences of higher educational institutions and by other scientific research institutes of the republic, as well as by the main institutes in the field of social knowledge of the Moldavian SSR, Ukrainian, and Belorussian Academies of Sciences, will hold an important place in the work of social scientists of the republic. It is quite clear that the task of strengthening the effective relations with the scientific centers of the Moldavian SSR Academy of Sciences and sectorial and republic academies of sciences, as well as the academies of the socialist countries, concerns not only the social, but also other fields of scientific knowledge. Proceeding from the basic provisions of the Policy Report of the CPSU Central Committee to the 27th party congress and the new version of the CPSU Program, it is necessary to write works on the cardinal problems of modern science, which require the interconnection of the social, natural, and technical sciences, by means of which it is possible to achieve radical qualitative changes in the development of the productive forces of the country and to attain a new level of efficiency. And, what I would especially like to emphasize, the problems, the solution of which contributes to the maximum degree to the acceleration of the socioeconomic development of the country, first of all the human factor and the development of the creative initiative of the masses in all spheres of life and in the accomplishment of the tasks posed by the 27th CPSU Congress, should be at the center of attention of social scientists.

In speaking about the role of science in the implementation of the strategy of the acceleration of socioeconomic development, it is impossible not to speak about the problems, which are closely connected with it, but have now assumed a scale common to all mankind. On the one hand, the development of science depends on the direction in which the world process will develop--whether the confrontational trends will increase or the lessening of the threat of war will occur and the prospect of nuclear disarmament will emerge. On the other hand, science does not treat passively this contradictory global process of development, it is making its contribution, and a significant one, to one solution or another of the problem of war or peace.

The problem of peace and war, which is regarded as the primary global problem, requires the most active participation of scientists in its solution in favor of peace and, hence, the further rapid development of science itself. The

27th CPSU Congress made an important contribution to the settlement of this question, having advanced a constructive program of the campaign against wars and for the establishment of a durable and comprehensive system of international security. The problem of the prevention of the militarization of space holds an important place in this program. Man's going into space and its development were a new era in the interrelations of society and nature, which is giving new, truly unlimited freedom to scientific, technical, and social progress and its continuous development. This is a triumph of human thought and creative activity, but at the same time through the fault of the reactionary circles of imperialism space facilities are threatening to turn into a means of the destruction of mankind and all life on earth. Such is the tragic contradiction, with which the development of civilization was faced during the era of the transition from capitalism to socialism and communism and during the space age. The problem of the prevention of the militarization of space at present proves to be the question, on which not only our immediate future, but also the fate of all human civilization depend.

The Soviet Union, which from the very start of the space age came out against the militarization of the use of space facilities and in fact is developing space for peaceful purposes, is calling upon all states, which have these facilities, to take decisive and urgent steps against the "Star Wars" strategy. Our party and state are convinced, and this was spoken about with all certainty by M.S. Gorbachev in the Declaration of 15 January 1986, that by means of negotiations it is possible to achieve agreements, which prevent the militarization of space, and to ensure the development of the extraterrestrial expanses only in the name of man.

The question of the possible death of civilization, which recently was still discussed only on the philosophical level, is of not only theoretical importance. The alternative of the future--death or immortality--is now the most vital issue, on which the fate of each person and the future of his children depend. Whether or not man and mankind exist in the nuclear space age--this most important political problem has, in our opinion, a cardinal philosophical ring and, by touching upon the foundations of philosophy, links it with life. In this lies one of the peculiarities of modern social development, when philosophical questions, which still recently, it seemed, were exceptionally abstract, now require immediate practical action and the taking of steps against the nuclear threat in the name of the survival of the human race. "During the present troubled age," M.S. Gorbachev emphasized in the Policy Report of the CPSU Central Committee to the 27th party congress, "our social and, I would say, life strategy has the aim that people would save the planet and celestial and outer space, would develop it as new settlers of PEACE-LOVING civilization, having rid life of nuclear nightmares and having completely emancipated for the goals of development, and only development, all the best qualities of such a unique inhabitant of the universe as Man."

Man went into space not to thereby launch the age of "Star Wars." The first man, who went beyond the boundaries of our planet, a representative of the Soviet Union, dreamed about the peaceful development of the extraterrestrial expanses, and our party and state are doing everything to eradicate war on earth and in space and to firmly establish the strategy of "Star Peace." This historical optimism follows from all the work and all the documents of the

27th CPSU Congress, which gave correct answers to all the vital questions of the development of mankind, which given all the nonuniformity, complexity, and contradictoriness is advancing irrepressibly toward socialism and communism.

The workers of science, as is noted in party documents, have to mobilize their efforts and to increase substantially the efficiency of their activity both on the level of the acceleration of scientific and technical progress and on its basis--the acceleration of the socioeconomic development of the country and the assurance of the peaceful development of civilization. The 12th Five-Year Plan should become critical in the development of science and technology and their integration with production in the fulfillment of the crucial tasks which were posed by the 27th CPSU Congress and the 16th Moldavian CP Congress.

7807
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COMPLEXES, ENGINEERING CENTERS OF UKSSR ACADEMY OF SCIENCES

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 10, Oct 86 pp 69-72

[Article by Corresponding Member of the Ukrainian SSR Academy of Sciences Vladimir Tonkal, chief scientific secretary of the Presidium of the Ukrainian SSR Academy of Sciences: "From the Idea to Introduction"; first paragraph is EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV introduction]

[Text] The 27th CPSU Congress advanced the concept of the acceleration of the socioeconomic development of the country on the basis of scientific and technical progress. An enormous role in its accomplishment belongs to science. "It is necessary to look at the tasks of science in a new way, through the prism of the requirements of the times--the requirements of its resolute turn toward the needs of social production, and of production toward science," General Secretary of the CPSU Central Committee M.S. Gorbachev said at the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress. "All the units, which unite science, technology, and production, should be analyzed and consolidated from this standpoint." The results of scientific research serve society only when they are embodied in applied developments.

At the Ukrainian SSR Academy of Sciences much attention has traditionally been devoted to bringing the results of basic research up to the level of developments, which have been thoroughly tested and are ready for large-scale introduction. Such an orientation predetermined the establishment in the system of the Ukrainian SSR Academy of Sciences of its own pilot design and experimental production base, which today has 78 organizations. Among them are 32 design bureaus, 10 pilot plants, 29 pilot and experimental works, 5 computer centers, and 2 seismology parties. The scale and the efficiency of the work of these enterprises are continually increasing, which is making it possible to expand the front of research, to increase the range of introduction, and to strengthen the influence of science on the pace of technical progress in various sectors of industry.

The change of the nature and structure of research and its orientation toward the obtaining of end results of great national economic importance were responsible for the establishment during the past two five-year plans on the

basis of a number of leading academic institutes of large scientific technical complexes (NTK's).

At present eight such complexes are operating within the Ukrainian SSR Academy of Sciences. They have within them design and technological bureaus, pilot experimental works, and pilot plants. Their basic tasks are basic and applied research, experimental design development and its production support, and the prompt and high-quality bringing of scientific results up to complete readiness for production. The activity of the scientific technical complexes is carried out on the basis of comprehensive planning, unified financing, and a unified material and technical base. The high scientific level and practical value of the work being performed by them are predetermined by the large reserve of basic and applied research and by the significant potential of not only scientists, but also skilled engineering and technical personnel.

Experience shows that for the system of the Ukrainian SSR Academy of Sciences scientific technical complexes are the optimum form of goal-oriented basic research, which ensures complete readiness of its results for large-scale introduction. It creates favorable conditions for the intensification of scientific research, the sharp increase of the number of developments in the interests of the national economy, the increase of quality, and the substantial shortening of the time of their practical implementation.

Thus, the Scientific Technical Complex of the Institute of Electric Welding imeni Ye.O. Paton of the Ukrainian SSR Academy of Sciences (IES) required only 2.5 years to develop and introduce in production in collaboration with organizations of the Ministry of Construction of Petroleum and Gas Industry Enterprises unique equipment for the butt resistance welding of large main pipelines. They were successfully used, in particular, during the laying of the Urengoy-Pomary-Uzhgorod gas pipeline.

The process of forming scientific technical complexes in the sphere of science is of just as an objective nature as the establishment of scientific production associations (NPO's) in industry. Both realize profound integration trends in the economy of developed socialism and are one of the most promising organizational forms of the union of science, technology, and production at the present stage. It is natural that differences also exist between them. Scientific technical complexes in most instances elaborate intersectorial problems, using the results at the meeting point of sciences.

The experience of the Ukrainian SSR Academy of Sciences stimulated the establishment of interbranch scientific technical complexes (MNTK's), which are being organized in the country in conformity with the decree of the CPSU Central Committee and the USSR Council of Ministers. Among the first 16 interbranch scientific technical complexes 2 were established on the basis of the Scientific Technical Complex of the Institute of Electric Welding imeni Ye.O. Paton and the Scientific Technical Complex of the Institute of Problems of Material Science of the Ukrainian SSR Academy of Sciences. It is possible to illustrate their work using the example of the Interbranch Scientific Technical Complex of the Institute of Electric Welding imeni Ye.O. Paton.

The institute proper, the Pilot Design and Technological Bureau, the pilot plants of welding equipment, welding materials, and special electrometallurgy, as well as the Experimental Works and the Special Design and Technological Bureau for Explosion Metal Working with a pilot works belong to the complex.

The total number of workers of the interbranch scientific technical complex is more than 9,000. The institute, which holds the leading place in the structure of the complex, and its subdivisions annually complete work on 750-800 economic contracts with organizations and enterprises of many union and republic ministries and departments.

Institutes and enterprises of the Ministry of the Electrical Equipment Industry, the Ministry of the Machine Tool and Tool Building Industry, the Ministry of Chemical and Petroleum Machine Building, the Ministry of Instrument Making, Automation Equipment, and Control Systems, and the USSR State Agroindustrial Committee are also participating in the work of the Interbranch Scientific Technical Complex of the Institute of Electric Welding imeni Ye.O. Paton. Among them, in particular, are the All-Union Scientific Research, Planning, Design, and Technological Institute of Electric Welding Equipment (Leningrad), the Vsesoyuznyy proyektno-konstruktorskiy institut svarochnogo proizvodstva Scientific Production Association (Kiev), the All-Union Scientific Research and Design Institute of Oxyacetylene Machine Building (Moscow), the Leningrad Elektrik Plant, the Kakhovka Plant of Electric Welding Equipment, the Pskov Plant of Heavy Electric Welding Equipment, the Fastov Plant of Electrothermal Equipment, the Kalinin Tsentrosvar Plant, the Barnaul Machinery and Equipment Plant, and others.

The main task of the Interbranch Scientific Technical Complex of the Institute of Electric Welding imeni Ye.O. Paton is the scientific, technical, and organizational support of priority research and development in the field of welding, protective coatings, and special electrometallurgy. All these are important national economic problems of an intersectorial or multisectorial nature, which are connected with the fundamental renovation and modernization of production, the sharp increase of its technical and technological potential, and the increase of the efficiency of labor by the use of the achievements of science and technology.

The complex is being made responsible for the conducting and coordination of the basic and applied research in this field, which is being carried out in the country, and the development on its basis of advanced technologies, first-class equipment, and promising materials. Important demands are being made on the work: it should be performed at the level of the best foreign models or should surpass them, in order to bring our country up to the leading levels in the world and to attach to it leading positions in the key directions of scientific and technical progress. This is especially important, if you consider that the Interbranch Scientific Technical Complex of the Institute of Electric Welding imeni Ye.O. Paton is taking part in the fulfillment of the assignments of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000. As is known, the supervision of one of its five priority directions--"New Materials and Technologies of Their Production and Processing"--has been assigned to the Ukrainian SSR Academy of Sciences.

A significant amount of work of the complex involves the assurance of a high degree of readiness of the innovations being developed for rapid and large-scale introduction in production and assistance in their assimilation and efficient use by the sectors of the national economy. Moreover, these innovations are not being adapted to and are not being made to fit obsolete flow charts, but are being incorporated in a new production process, which is making it possible to raise it to a modern technical level.

The determination of the prospects and the planning of the development of welding, special electrometallurgy, and the production of protective coatings and the formulation and implementation of scientific and technical programs hold an important place in the activity of the Interbranch Scientific Technical Complex of the Institute of Electric Welding imeni Ye.O. Paton.

The establishment within a number of scientific technical complexes of the Ukrainian SSR Academy of Sciences of special problem-oriented subdivisions--engineering centers--was a qualitatively new step. This is becoming necessary where the implementation of scientific achievements is not supported technologically and technically in the potential fields of application and the appropriate personnel are lacking. Precisely such a picture is observed when it is a question of truly revolutionary developments.

The activity of the engineering centers, in spite of the difference of the problems being worked on by each of them, is based on uniform organizational structural principles. A number of design and technological divisions of the scientific technical complex belong to the center. A pilot works and plant of the complex are also attached to it. One or several subdivisions of the institute headed by the scientific supervisor carries out scientific coordination.

The engineering center works on the basis of cost accounting with production associations and enterprises of various ministries and departments, which act either as clients of its products and services or as manufacturers of the latest equipment and materials, which the center needs. The entire set of related scientific research and planning and design organizations, with which they closely interact, is the "external environment" of the engineering centers.

In conformity with the type of activity the engineering centers study the needs of the national economy for some developments or others and determine the efficient areas of their use. On their own or on the basis of cooperation they organize the production of single specimens and pilot runs of the latest equipment, instruments, and materials. Specialists of the centers acquaint the representatives of production with advanced technologies and models of the latest equipment and materials and demonstrate their possibilities for the accomplishment of specific technological tasks of sectors.

An important task of the engineering centers is the preparation of suggestions on the organization of the series production of new equipment and the drawing up of planning and design documents for the large-scale introduction of the latest technologies, equipment, and materials, the establishment of new shops,

sections, production lines, and flexible production systems, and the modernization of operating works. Before the start of the series production of new items the centers take upon themselves the delivery of individual specimens of equipment and materials to enterprises of the national economy, as well as for export.

Such responsible functions as the training of skilled specialists for the efficient use of equipment and technologies in the sectors of industry and the provision of scientific, technical, and consultative assistance to production associations and enterprises in the assimilation and use of innovations and the establishment of service subdivisions in the sectors also fall to the engineering centers.

The structure of the engineering center makes it possible to successfully surmount departmental barriers, while providing a significant saving of time. By concentrating within themselves the bulk of the work on the introduction of scientific results and by having copyrights to them, the engineering centers not only free sectorial ministries and departments from the settlement of many difficult, specific issues, but also can within a very wide range modify developments in the interests of sectors, as well as carry out their qualitative improvement directly in the process of introduction, while this makes it possible to reduce the significant losses of time and resources, which inevitably arise at the juncture of different generations of new equipment in case of the use of some forms.

On the other hand, the engineering centers free research scientists from the settlement of many routine issues and labor-consuming tasks, which are directly connected with the organization of introduction. While this enables them to concentrate efforts on the solution of urgent scientific and technical problems. Stable feedback with industry, which stimulates the further conducting of goal-oriented basic research in the interests of the national economy, is formed owing to the activity of the engineering centers.

At the Ukrainian SSR Academy of Sciences the work on the formation of engineering centers began 5-6 years ago. They took shape organizationally in 1984. At present nine such centers are functioning at the academy. In the Scientific Technical Complex of the Institute of Electric Welding imeni Ye.O. Paton there are six of them: pressure welding, electron-beam technology, the robotization of the production of welded components, electroslag technology, protective and strengthening coatings, and explosion metal working. The engineering centers of microelectronics and automated systems of the processing of bank data have been established in the Scientific Technical Complex of the Institute of Cybernetics imeni V.M. Glushkov, the engineering center of the development of equipment for high pressures and temperatures for the purpose of obtaining ultrahard materials has been established in the Scientific Technical Complex of the Institute of Ultrahard Materials.

The experience of the engineering center of pressure welding of the Scientific Technical Complex of the Institute of Electric Welding imeni Ye.O. Paton demonstrates the possibility of the successful accomplishment of the complex scientific, production, and organizational tasks of the large-scale commercial assimilation of fundamentally new technologies.

The development and introduction of pressure welding methods are contributing to the acceleration of the pace of technical progress in many sectors of the national economy. Taking this into account, as well as the complexity and multisectorial nature of the arising problems, the engineering center is actively interacting with enterprises and organizations of many ministries. The questions of the production and assimilation of the latest equipment, the consideration of the technological peculiarities of various sectors, and the training of skilled personnel for the introduction and servicing of new equipment are being settled at the same time by the center.

The close creative cooperation on the basis of a unified thematic plan of scientists of the institute, designers and process engineers of the special design and technological bureaus, and workers and engineers of the pilot plant is making it possible in the shortest time to carry out the development of advanced equipment, to devise and test new assemblies and control systems, and to test technological processes. Only a little more than 2 years were needed in order to conduct scientific research, to develop the technology, and to design, produce, and introduce diverse high-performance welding equipment, which does not have analogs in domestic and foreign practice. This work was commended by the Lenin Prize and the USSR and Ukrainian SSR State Prizes and by gold medals at international exhibitions. Firms of the United States, Canada, Japan, and Austria have purchased five licenses for the equipment and technology of flash welding. Soviet welding equipment worth $2 million is delivered annually to these countries.

Unique technologies and machines for the welding of high-strength high-gauge aluminum alloys, which is of revolutionary importance for machine building, are presently being developed.

New equipment for the resistance welding of pipes from the smallest diameters to super pipelines 1,420 millimeters in diameter is being developed for the Ministry of Construction of Petroleum and Gas Industry Enterprises. The use of such equipment during the 12th Five-Year Plan (1986-1990) will make it possible to free up to 5,000 highly skilled welders and to increase labor productivity by three- to fivefold.

The activity of other engineering centers is also concentrated on the rapid and large-scale introduction of the results of research in the most important directions of scientific and technical progress. As a new promising form of the contact of science with production they have already demonstrated their effectiveness and viability.

An important task is to achieve the extensive use of these forms in various departmental complexes and scientific production associations, which can substantially accelerate the introduction of the latest achievements of science and technology in industry.

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NUMBER, COMPOSITION OF SCIENTISTS BY DEGREES, TITLES

Moscow VESTNIK STATISTIKI in Russian No 12, Dec 86 pp 66-69

[Table under the rubric "Statistical Materials"]

[Text] I. The Number and Composition of Scientists By Academic Degrees and Academic Titles (at the end of the year; people)

	1960	1970	1975	1980	1985
USSR					
Number of scientists	354158	927709	1223428	1373263	1491326
of them, those having the academic degree of:					
doctor of sciences	10945	23616	32264	37747	44339
candidate of sciences	98262	224490	326767	396244	463549
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor	9907	18095	22942	27381	30952
docent	36155	68581	87884	110698	131811
senior scientific associate	20259	39005	53323	65951	77508
junior scientific associate and assistant lecturer	26693	48849	44978	41101	39740
RSFSR					
Number of scientists	242872	631111	838473	937665	1019089
of them, those having the academic degree of:					
doctor of sciences	7929	16135	22105	25838	30168
candidate of sciences	67146	145071	212363	257329	298988
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor	6784	11859	15146	17885	20135
docent	23610	42926	53783	66902	78331

[Table continued on following page]

	1960	1970	1975	1980	1985
senior scientific associate.....	14202	25184	34574	44012	51971
junior scientific associate and assistant lecturer.....	17783	32141	30367	29423	28143
Ukrainian SSR					
Number of scientists.....	46657	129781	171478	195782	210315
of them, those having the academic degree of:					
doctor of sciences.....	1343	3123	4163	4842	5879
candidate of sciences.....	13622	33317	47308	58002	68477
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	1308	2590	3211	3818	4360
docent.....	5892	12079	15106	19221	23019
senior scientific associate.....	2290	5085	6850	8395	10132
junior scientific associate and assistant lecturer.....	1731	3516	2266	1880	3716
Belorussian SSR					
Number of scientists.....	6840	21863	31020	38130	42452
of them, those habing the academic degree of:					
doctor of sciences.....	181	425	624	779	1011
candidate of sciences.....	2013	5564	8362	10820	13176
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	185	382	485	657	790
docent.....	855	1962	2724	3679	4834
senior scientific associate.....	369	855	1278	1709	2097
junior scientific associate and assistant lecturer.....	718	1036	1001	1273	1048
Uzbek SSR					
Number of scientists.....	10329	25244	30835	35288	38093
of them, those having the academic degree of:					
doctor of sciences.....	222	494	745	939	1215
candidate of sciences.....	2442	6907	10505	12992	15664
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	241	423	560	764	934
docent.....	1021	2126	2958	3941	5074

[Table continued on following page]

	1960	1970	1975	1980	1985
senior scientific associate.....	431	956	1291	1509	1777
junior scientific associate and assistant lecturer.....	687	890	1255	1593	1150
Kazakh SSR					
Number of scientists.....	9623	26802	32011	37390	40377
of them, those having the academic degree of:					
doctor of sciences.....	157	421	607	708	864
candidate of sciences.....	2123	6272	9642	11621	13828
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	178	340	468	557	650
docent.....	793	2009	2844	3769	4573
senior scientific associate.....	566	1097	1655	1776	1979
junior scientific associate and assistant lecturer.....	1530	1646	1646	772	685
Georgian SSR					
Number of scientists.....	9137	20160	24941	25198	27605
of them, those having the academic degree of:					
doctor of sciences.....	430	989	1228	1335	1387
candidate of sciences.....	3207	5860	7679	9104	10706
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	392	814	911	1045	1065
docent.....	1195	1698	2183	2696	3053
senior scientific associate.....	739	1752	1912	2019	2103
junior scientific associate and assistant lecturer.....	1184	3084	1608	616	864
Azerbaijan SSR					
Number of scientists.....	7226	17082	21280	21993	23182
of them, those having the academic degree of:					
doctor of sciences.....	189	652	811	907	975
candidate of sciences.....	1983	5346	7196	8186	9356
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	204	506	623	708	757
docent.....	743	1141	1862	2174	2758

[Table continued on following page]

	1960	1970	1975	1980	1985
senior scientific associate.....	474	1197	1523	1515	1743
junior scientific associate and assistant lecturer.....	682	2042	3145	2323	2069
Lithuanian SSR					
Number of scientists.....	3320	8978	12538	14307	14825
of them, those having the academic degree of:					
doctor of sciences.....	31	182	274	347	474
candidate of sciences.....	758	2710	4339	5197	6023
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	72	165	231	331	425
docent.....	285	923	1348	1841	2248
senior scientific associate.....	87	389	676	864	1041
junior scientific associate and assistant lecturer.....	227	362	83	32	115
Moldavian SSR					
Number of scientists.....	1999	5695	7309	8807	10289
of them, those having the academic degree of:					
doctor of sciences.....	48	113	192	241	322
candidate of sciences.....	564	1834	2882	3506	4262
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	39	97	142	183	214
docent.....	198	519	699	922	1183
senior scientific associate.....	133	284	435	524	660
junior scientific associate and assistant lecturer.....	196	589	668	76	57
Latvian SSR					
Number of scientists.....	3348	8895	12024	12585	13536
of them, those having the academic degree of:					
doctor of sciences.....	64	175	262	332	394
candidate of sciences.....	898	2517	3484	4172	4758
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	97	165	200	250	295
docent.....	346	719	1052	1320	1513

[Table continued on following page]

	1960	1970	1975	1980	1985
senior scientific associate.....	177	387	543	669	758
junior scientific associate and assistant lecturer.....	195	650	565	662	620
Kirghiz SSR					
Number of scientists.....	2315	5867	7131	8194	9145
of them, those having the academic degree of:					
doctor of sciences.....	56	128	172	198	225
candidate of sciences.....	587	1572	2214	2588	3120
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	64	114	132	170	187
docent.....	197	412	545	684	822
senior scientific associate.....	110	309	462	469	537
junior scientific associate and assistant lecturer.....	172	37	31	18	2
Tajik SSR					
Number of scientists.....	2154	5067	6629	7590	8452
of them, those having the academic degree of:					
doctor of sciences.....	33	102	149	183	229
candidate of sciences.....	433	1364	2126	2505	3074
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	40	90	120	147	172
docent.....	150	358	571	785	979
senior scientific associate.....	111	204	335	409	466
junior scietific associate and assistant lecturer.....	198	1131	510	417	162
Armenian SSR					
Number of scientists.....	4275	12808	17138	19059	21453
of them, those having the academic degree of:					
doctor of sciences.....	164	482	630	700	733
candidate of sciences.....	1502	3346	4734	5624	6751
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	161	370	479	540	595
docent.....	562	1006	1268	1566	1968

[Table continued on following page]

	1960	1970	1975	1980	1985
senior scientific associate.....	364	821	1091	1262	1291
junior scientific associate and assistant lecturer.....	520	1176	1424	1642	757
Turkmen SSR					
Number of scientists.....	1836	3649	4634	5030	5554
of them, those having the academic degree of:					
doctor of sciences.....	32	62	92	108	136
candidate of sciences.....	361	1200	1714	1998	2391
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	52	54	62	84	97
docent.....	102	239	331	437	539
senior scientific associate.....	77	186	261	308	364
junior scientific associate and assistant lecturer.....	329	13	1	-	-
Estonian SSR					
Number of scientists.....	2227	4707	5987	6245	6959
of them, those having the academic degree of:					
doctor of sciences.....	66	133	210	290	327
candidate of sciences.....	623	1610	2219	2600	2975
Of the total number of scientists, those having the academic title of:					
academician, corresponding member, professor.....	90	126	172	242	276
docent.....	206	464	610	761	917
senior scientific associate.....	129	299	437	511	589
junior scientific associate and assistant lecturer.....	341	536	408	374	352

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CSO: 1814/84

LEGISLATION ON PROTECTION OF RIGHTS OF INVENTORS

Moscow SOVETSKAYA YUSTITSIYA in Russian No 20, Oct 86 pp 10-13

[Article by Candidate of Juridical Sciences I. Orkis: "Questions of Authorship and the Acceleration of Scientific and Technical Progress"]

[Text] Creative technical work is a form of the participation of millions of workers in the acceleration of scientific and technical progress and a mode of their active social self-expression.

The freedom of creative activity always was a component of the legal status of USSR citizens. The Communist Party and the Soviet state are giving creative scientific, technical, and artistic work the closest attention and comprehensive support. This consistent position of the state is expressed most thoroughly and vividly in Articles 15, 20, 26, and 47 of the USSR Constitution. In the new version of the CPSU Program it is indicated: "...The party links the successful accomplishment of the outlined tasks with the increase of the role of the human factor. Socialist society cannot function effectively without finding new means of developing the creative activity of the masses...." Man, who is striving for the highest world achievements in science, technology, economics, and culture and is displaying interested participation in the outlined transformations, in active movement toward creative successes in any matter, especially in research and planning operations, the designing of new machines, creative artistic work, and so on, is being brought to the center of the complex processes of modernization.

Creative technical work is an activity, in the process of which a qualitatively new technical solution, which is distinguished by originality, is developed.

The results of creative work, regardless of the condition of their creation, are of an especially personal nature. Taking their importance into account, society and the state are experiencing a need for the individualization of these results. The principle, in accordance with which the creative achievement of an author should not be appropriated by other people, follows from this. Thus, only the creative contribution of each of the parties to the legal relationship of inventors is the main, underlying base of the claim of one person or another to scientific research, designs, models, and prototypes, which have been completed by him, and in case of his submitting of an

application to the appropriate organ and a positive decision the right of authorship to an invention, efficiency proposal, or production prototype.

With allowance made for this it was established by the 1973 Statute on Discoveries, Inventions, and Efficiency Proposals that only the person, who by his creative efforts solved in a new way the entire or a portion of the problem, which is basic in the discovery, invention, or efficiency proposal, is recognized as the author. The people, who gave the author (coauthors) technical assistance: made calculations and diagrams, gave advice and consultations, produced drawings and prototypes, and checked them, will not acquire authors' rights. Even the design or technological analysis of the proposal being introduced does not create authors' rights, if the subject of the discovery, invention, or efficiency proposal is not supplemented in so doing by new distinctive features which have been registered by an independent or additional application. Here one should also distinguish authorship from coperformance or collaboration, since the creative solution of the essence of the scientific or technical problem comes only from the author, only his rights are protected by that state.

For example, the Ordzhonikidzevskiy Rayon People's Court of Sverdlovsk satisfied the claim of K. on his recognition as coauthor of an invention for a rolling mill, since it was established that the plaintiff had made a creative contribution to the development of one of the basic assemblies of the device and his technical solution is one of the features of the distinguishing part of the formula of this invention (BYULLETEN VERKHOVNOGO SUDA SSSR, No 3, 1985, p 42).

Civil legislation provides the authors of scientific and technical achievements with a set of subjective rights and duties, which characterize his social status and the existence of special rights and benefits. These rights of the author are of a personal nonproperty nature. But his property rights also follow from them. The emergence of the majority of nonproperty rights is possible only in case of the establishment (recognition) for him of the right of authorship to a specific achievement.

The right of authorship in the system of legal relations of inventors is central. Only citizens can be its bearers. It lacks economic content, since it emerges in connection with the solution of a technical or a scientific problem; all organizations and natural persons are obliged to refrain from its violation. The fact that in the Fundamentals of Civil Legislation and accordingly in the civil codes of the union republics there is no norm, which confirms the possibility of the emergence for the creator of a discovery, invention, efficiency proposal, or production prototype of the right of authorship to the achievement developed by him, is a substantial flaw. Especially under the conditions of the scientific and technical revolution, as well as when regulating the interrelations of the coauthors.

One of the urgent problems in creative scientific and technical work is the problem of coauthorship. In case of the joint creative solution by several people of one scientific or technical problem the legal relations of coauthorship arise. They arise prior to the submitting of the application materials, since the authors should specify the subject (formula) of the

innovation and the group of coauthors, who are included on the list, come to an understanding (draw up an agreement) on the degree of the creative participation of each person, and settle other questions, which are connected with the protection of the creative result.

Coauthorship is always equal, for it is a question of a personal nonproperty right. The degree of the creative importance of the contribution of each of the coauthors to the invention or efficiency proposal can be different. The distribution of the reward among the authors and other consequences of its recognition and use depend on this. Precisely for this reason in the 1973 Statute it is stated: "The procedure of the exercise of the rights, which belong to the coauthors jointly, is specified by the agreement of the coauthors." However, the absence in the Fundamentals and civil codes of norms on authorship and coauthorship for achievements of science and technology decreases the opportunities of the innovators to settle themselves questions of coauthorship. On the other hand, the difficulties of introducing innovations created conditions, when people, who did not take part in the creative solution of a scientific or technical problem, began to be recognized as coauthors. Such importunities are repudiated by the courts. For example, the judicial collegium for civil affairs of the Leningrad City Court rejected the claim of N. on his recognition as coauthor of an invention. It established that the technical solution, features of which were reflected in the formula of the invention, was developed without the creative participation of the plaintiff. And although N. participated in the work on the improvement of the design, which was developed on the basis of the invention, the judicial collegium indicated that such participation does not create the right to coauthorship (BYULLETEN VERKHOVNOGO SUDA SSSR, No 3, 1985, p 41).

The breakdown of the conditions of the recognition of the right of authorship to technical achievements in accordance with the attribute of their development in an official or individual manner is a serious problem which requires separate solution (and independent coverage). The further specification of the legal conditions, without which the application of the "attribute of an official nature" can entail the restriction of the rights of the actual authors and restrict the freedom of their creative technical work, should be combined with the clearly specified duty of all organizations (enterprises) to give patent and technical assistance to each innovator. Let us examine a portion of the issues of this problem in greater detail. Back before the adoption of the 1973 Statute the Committee for Inventions and Discoveries attached to the USSR Council of Ministers resolved: "The inclusion among the coauthors of managers and other officials, who did not take a creative part in the work on the development of the given invention, is not permitted..." (Paragraphs 8-11 of Explanation No 1 (29) of 28 May 1971 "On Coauthorship to Inventions Which Were Developed in Connection With the Fulfillment of an Official Assignment," "Sbornik normativnykh aktov po izobretatelstvu i ratsionalizatsii" [A Collection of Enforceable Enactments on Invention and Efficiency Promotion], Yuridicheskaya literatura, 1983, p 145). Previously the authors themselves indicated the information on the specific creative contribution, just as the list of coauthors, in the text of the application on the proposed invention. In it there is a section, which contains an official enumeration of all the actual authors and a warning on the liability for the appropriation of authorship or coercion into

coauthorship. But only if difficulties arose with the determination of the composition of the coauthors was this question examined by the technical or scientific council, and in the absence of a council by an ad hoc commission. However, in this case the authors also retained the freedom to specify the group of coauthors and had the right in the application materials to stipulate their own particular opinion.

With the adoption of the 1973 Statute the administrative control over the specification of the composition of authors became somewhat more rigid, since "the certificate on the creative participation of each of the coauthors in the development of the invention" (Paragraph 44) was indicated among the mandatory documents which formed the application. Here the traditional practice also "took effect": the official stamps of the manager of the division (shop, laboratory), the deputy for science (the chief engineer), and others are needed for the signing of the certificate. The authors of a scientific or technical achievement, which is registered through an enterprise (organization), thus proved to be dependent on a large number of "nonauthors," and this contributed to the tradition of "mandatory" coauthorship.

In accordance with the Instructions on the Procedure of the Drawing Up of Applications for Inventions Developed in Collaboration, which was approved by the decree of the USSR State Committee for Inventions and Discoveries of 8 July 1983, already at the stage of the drawing up of the application materials the scientific and technical (scientific, technical) council at the place of the development of the invention should consider and settle the question of the composition of the authors and the degree of their creative participation in the development of the innovation. The certificate is issued on the basis of the protocol on such an examination. But this is still not everything. "In case of the absence at the organization of the corresponding council...this question is considered by the labor collective...(Paragraphs 10 and 19 of the USSR Law on Labor Collectives)." To say nothing of the fact that Article 10 of the indicated law does not grant such a right to either the labor collective or its elected organs, the very need to submit the legal relations of the authors for the consideration of the production collective is a gross violation of Article 47 of the USSR Constitution and the Law on Labor Collectives, which guarantee the freedom of creative technical work and the protection of this right of authors. Let us also note that the divulgence to an unlimited number of people of the basic features of the innovation discredits the novelty of the proposed invention (Paragraph 21 of the 1973 Statute).

The regulation, which is set forth in Paragraph 2 of Point 132 of the Instructions on the Drawing Up of an Application for an Invention, in accordance with which there can also be included among the coauthors people, who creatively "elaborated the theoretical bases of parameters, conducted experiments, gave the tool the appropriate form," that is, performed the same technical operations, which in accordance with the 1973 Statute do not create the right of coauthorship, had a great influence on the spread of "mandatory" coauthorship. Such instructions of the USSR State Committee for Inventions and Discoveries, which specify the procedure of drawing up an application, signify an actual departure from one of the principles of civil law and the fact that creativity is the basis of the authorship and coauthorship of a

scientific, technical, and artistic work. The proper understanding of the right to coauthorship is contained in Decree No 22 of the Plenum of the USSR Supreme Court of 15 November 1984, "On the Application by the Courts of Legislation Which Regulates the Relations Which Arise in Connection With Discoveries, Inventions, Efficiency Proposals, and Production Prototypes": "When considering disputes about the coauthorship of an invention the court should establish the nature of participation of each of the people...in the development of the technical solution, the set of features of which received reflection in the formula of the invention." Attention has already been directed to this circumstance in the legal press (SOVETSKAYA YUSTITSIYA, No 4, 1985, p 13), but today Paragraph 132 of the Instructions on the Drawing Up of Applications for an Invention has not been changed. It is possible, therefore, to draw the conclusion that neither the 1973 Statute, the own explanations of the USSR State Committee for Inventions and Discoveries of 1971 and 1983, the decree of the Presidium of the USSR Supreme Court, nor the constant criticism of this regulation in the pages of the press yielded a result. In practice in many applications for inventions, which are received from enterprises (organizations), the "mandatory," "traditional" coauthors are now also indicated, for without their inclusion the application materials, perhaps, would not be sent at all for state scientific and technical patent examination.

The policy of the party of accelerating socioeconomic development on the basis of the achievements of scientific and technical progress, in combination with the constitutional guarantee of the freedom of creative scientific and technical work, is creating real possibilities for its active flourishing and the maximum development of the institutions of authorship and coauthorship. The broadening of the real possibilities of the realization by USSR citizens of their creative abilities is one of the tasks of our state.

With allowance made for the importance of the human factor in creative technical work at the 27th party congress it was noted that the main thing is the provision of the necessary economic, social, and organizational prerequisites for the creative labor of engineers, scientists, and designers. Precisely they are the generators of scientific ideas and developments, the technical level of production depends first of all on them. In this connection let us direct attention to the existing limitations of the possibility for specific groups of specialists to realize their claim to technical proposals. The reason for this is the gaps and contradictions in the legislation, as well as the shortcomings of traditional practice. Let us examine just a few of them.

Scientists are not mentioned as subjects of the right of authorship either in the Fundamentals of Civil Legislation, in the civil codes of the union republics, or in the 1973 Statute in the sections, which regulate the development, introduction, and use of the achievements of science and technology and the stimulation of its authors. And not only scientists of research organizations and organizations equated with them, but also instructors of higher and secondary specialized educational institutions and scientists of integrated design, technological, and planning organizations of all sectors of the national economy. Only engineering and technical personnel are indicated as subjects of the right of authorship. By not regulating the

creative activity of scientists, instructors, and students, the current legislation on invention also does not encompass all the diversity of the new forms of joint creative activity in the field of technology: at scientific production associations (NPO's), at interbranch scientific technical complexes (MNTK's) and in public comprehensive programs, in territorial and goal state and public scientific technical programs, and so forth. In case of the formal application to the technical proposals of scientists (developers, designers) and their coauthors of the prevailing regulations (what is meant is the Explanation on Several Questions Concerning Recognition as Efficiency Proposals of the Engineering and Technical Personnel of Scientific Research, Planning, Design, and Technological Organizations and Similar Subdivisions of Enterprises, as Well as the Procedure of Their Submitting, which was approved by the decree of the USSR State Committee for Inventions and Discoveries of 15 May 1975) the right of authorship to proposals (except an invention) does not arise for them. There is also no clarity in the possibility of recognizing as efficiency proposals the joint proposals of staff members of scientific research organizations, scientific production associations, higher educational institutions, and enterprises (to which other pilot enterprises and planning design organizations also belong). The different legal status of their personnel gives rise to completely different rights for the coauthors of the same innovation. The detailed elaborations and recommendations, which have been published in the press and contain proposals on the comprehensive solution of this problem and a set of norms, have not been used.

The prevailing regulations validly exclude from the sphere of legal protection the proposals (except for inventions) of developers and designers, which are grouped with the plans, designs, and technologies, which are directly executed by them. However, the subsequent regulations, which developed the first ones, also do not grant legal protection to the proposals of those developers, who did not themselves execute the indicated plans or structures (see Paragraph 8 of the Explanation on the Procedure of Submitting an Application for an Efficiency Proposal Which Pertains to Capital Construction, which was approved by the decree of the USSR State Committee for Inventions and Discoveries of 28 March 1978), if during the period of the submitting of the proposal they carry out author's supervision. All these restrictions have also been extended to the engineering and technical personnel of the system of the USSR State Bank and the All-Union Bank for Financing Capital Investments.

A serious violation of the right of authorship to achievements of technology, the exclusive right to which belongs to the state, is the failure to introduce these achievements and their incomplete or untimely use. The duty of the state to organize the introduction of the achievements of science and technology is stipulated by Articles 26 and 47 of the USSR Constitution. However, in the Fundamentals of Civil Legislation (Article 111), the RSFSR Civil Code (Article 521), and the 1973 Statute (Paragraph 27) this duty is not recorded at all or is mentioned as the right of state and public enterprises and organizations to use achievements at their own discretion, in a planned manner, or by way of initiative. Let us note that the granting to the authors of inventions, efficiency proposals, and production prototypes of nonproperty and property rights and benefits is mainly connected with the fact of the industrial application (use) of their achievements. The consequences of the failure of enterprises (organizations) to fulfill this duty will be really

appreciable for the author, especially in the area of the determination of the utility and the paying of rewards for the used innovation (see SOVETSKAYA YUSTITSIYA, No 11, 1986, p 21). For the Fundamentals of Civil Legislation, the civil codes, and other acts merely proclaim the need for the use of innovations, although the exclusive right to the results of creative work in accordance with the conditions of the inventor's certificate always passes to the state. Such a contradiction between the USSR Constitution and the laws, which were passed in 1961 and 1964, and the enforceable enactments, which have been in effect since 1973, is creating the need for the revision of the legislation on invention. This will have a direct influence on the efficiency of creative technical work.

The further improvement of the protection of creative scientific and technical work, the increase of the number of authors and their activeness, the improvement of the use in the national economy of the achievements of science and technology--here are the underlying bases of the acceleration of scientific and technical progress. The interdependence and interaction of these factors should be reflected with allowance made for the provisions of the USSR Constitution in the enforceable enactments which regulate technical innovation and the rights of the creative individual. As it seems to us, the main thing is to create the social and production conditions for interested, socially valuable creative technical work. In precisely such a manner national interest will be united with the interests of innovators and production leaders, who should receive not only recognition and support, but also decisive influence, a decisive voice in determining technical policy.

In our opinion, all the practical conditions exist for the implementation of such proposals, since the need to bring current legislation on invention, efficiency promotion, and production prototypes in line with the Fundamental Law of the USSR was envisaged and stipulated by it long ago in Article 173. When improving this subsector of the legislation the most important legal norms should be included in the Fundamentals of Civil Legislation and the civil codes, while the technical and legal norms, which are now contained in them, should be placed in the new statute and instructions on the reward.

The fact that the regulations being criticized are concentrated not in laws, but in sublegal and enforceable enactments, have been repeatedly and extensively covered in special literature, and are not divided by judicial practice, is contributing significantly to the elimination of everything superfluous from the legal regulation of creative scientific and technical work and authorship. The fact that the Plenum of the USSR Supreme Court in Decree No 8 of 18 April 1986 "On the Application by the Courts of Legislation When Considering Disputes Which Follow From the Legal Relations of Authors" again emphasized the significance of creative scientific, technical, and artistic work and the importance of the protection of its results and the rights of the authors, attests to the urgency of the questions raised by us. Under the conditions of the intensification and renovation of the national economy, the intensification of technical competition, and other forms of the opposition of the world socialist and capitalist systems, the problems of the

stimulation of the human factor and, on its basis, the acceleration of scientific and technical progress are of great economic and political importance.

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CONTRIBUTION OF N.A. GORYUNOVA TO SEMICONDUCTOR RESEARCH

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR: SERIYA FIZIKO-TEKHNICHESKIKH I MATEMATICHESKIKH NAUK in Russian No 2, 1983 pp 73-74

[Article by S.I. Radautsan, V.A. Radul, and L.S. Radautsan under the rubric "News Item": "The Role of N.A. Goryunova in the Organization of Studies of Semiconductor Materials at the Moldavian SSR Academy of Sciences"]

[Text] In celebrating the 25th anniversary of the Moldavian SSR Academy of Sciences, we are recalling with deep gratitude the prominent scientists of the country, who have made a significant contribution to the formation of scientific schools in our republic.

The name of Professor Nina Aleksandrovna Goryunova is inseparably connected with research in the chemistry and physics of compound semiconductors. Her scientific heritage is an invigorating source for the leading specialists of semiconductor materials science of many countries of the world. N.A. Goryunova contributed to the training of scientists for Moldavia and repeatedly came to Kishinev for consultative assistance, the delivery of lectures, and participation in all-union and international conferences. Several of the most important ideas of N.A. Goryunova were published for the first time in Kishinev. Thus, in 1961--the year of the formation of the Moldavian SSR Academy of Sciences--the article of N.A. Goryunova and N.K. Takhtareva "The Formation of Solid Solutions Between Indium Antimonide and Arsenide" appeared in IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR. This work was the basis for a series of studies in this direction.

Among the scientists of Moldavia are students and followers of N.A. Goryunova--3 full members of the Moldavian SSR Academy of sciences, 10 doctors and more than 100 candidates of sciences. They are successfully conducting studies of binary and ternary semiconductor compounds, solid solutions based on them, as well as chalcogenide vitreous materials.

In November 1986 Nina Aleksandrovna Goryunova, a doctor of chemical sciences, professor, winner of the Order of Lenin, and one of the founders of the chemistry of adamantine materials, would have been 70. Nearly a contemporary of October, Nina Aleksandrovna grew up together with our country. The scientific successes achieved by her are vivid confirmation of the inexhaustible possibilities which the power of the people afforded the

workers. A student of Academician A.F. Ioffe and Professor R.L. Myuller, Nina Aleksandrovna took in the best traditions of the renowned Leningrad school. She was able to brilliantly generalize numerous odd data on semiconductor materials, which had been accumulated by the early 1950's, and to depict from a common standpoint the family of adamantine materials with allowance made for the direct dependence of the semiconductor properties of these substances on the composition, crystal structure, and nature of the chemical bond in them. In all the basic research conducted by N.A. Goryunova practical feasibility was also the ultimate goal.

The scientific activity of Nina Aleksandrovna began in 1946, when she was hired at the Leningrad Physical Technical Institute of the USSR Academy of Sciences. After the first discoveries, which were connected with the study of gray tin, N.A. Goryunova began research, which is now well known to the entire world, on generalizations of the laws of the change of properties in the family of adamantine semiconductors.

Characterizing this work, Professor D.N. Nasledov, a Lenin Prize winner and honored figure of science and technology of the RSFSR, emphasized that the works of N.A. Goryunova are the first research, in which a new class of semiconductor compounds--analogs of germanium and silicon--was detected. They were the start of the comprehensive work, which was performed at the Physical Technical Institute, on the study of practically promising binary semiconductor compounds like the III-V compound, as well as their ternary analogs.

At the Moldavian SSR Academy of Sciences studies of compound semiconductors are being conducted at the Institute of Applied Physics and the Special Design and Technological Bureau of Solid-State Electronics. Much attention is being devoted to the growing of perfect single crystals and epitaxial structures based on indium and gallium phosphides, solid solutions and heterostructures based on indium and silicon antimonides, zinc and lead tellurides, as well as ternary chalcogenides with the structure of a spinel. The work is being performed under the supervision of Academicians of the Moldavian SSR Academy of Sciences D.V. Gitsu and S.I. Radautsan, Doctors of Sciences E.K. Arushanov, S.L. Pyshkin, and V.V. Sobolev, and others. The results of the research have been repeatedly reported at all-union and international conferences. Multicomponent semiconductors are being successfully used at higher educational institutions of Moldavia under the supervision of Professors M.V. Kot, A.V. Simashkevich, V.P. Mushinskiy, and F.S. Shishiyanu, Docent I.P. Molodyan, and other scientists.

Academician Secretary of the Physical, Technical, and Mathematical Sciences Department of the Moldavian SSR Academy of Sciences D.V. Gitsu recalls that the idea of Nina Aleksandrovna on the formation of an isoelectronic series of adamantine semiconductors gave him the idea of finding compound isoelectronic analogs of the pentavalent semimetals bismuth and antimony.

Vitreous semiconductor materials, which were discovered by N.A. Goryunova jointly with State Prize winner Professor B.Y. Kolomiyets in 1954, held an specially important place in her work. This research was the basis of a new direction in modern solid-state physics--the physics of disordered media. The

interest in vitreous semiconductors stemmed, on the one hand, from their multiple practical application and, on the other, from their simplicity from the standpoint of the technology of obtaining them and their reliability in operation even under the conditions of increased radiation.

In the Moldavian Republic the work on the study and use of vitreous chalcogenide semiconductors was continued and developed under the supervision of Academician of the Moldavian SSR Academy of Sciences A.M. Andriyesh and Doctors of Physical Mathematical Sciences L.M. Panasyuk and S.D. Shutov. Multilayer structures were obtained for use in electrophotography and the photothermoplastic recording of information and for the development of space-time light modulators. Fibers made of vitreous arsenic chalcogenides were grown and the effect of the ordering of the material of the fiber, which arises in the process of its drawing, was detected. A.M. Andriyesh reported on this research at an international conference on amorphous semiconductors in Rome in September 1985.

Today an entire scientific direction in the study of compound semiconductor materials has formed in Soviet Moldavia. The results of the research of Moldavian scientists, which are well known in our country and beyond it, were appreciated by the homeland. For the obtaining, comprehensive study, and use of crystalline and amorphous binary semiconductors A.M. Andriyesh, E.K. Arushanov, M.V. Kot (posthumously), I.P. Molodyan, V.P. Mushinskiy, S.I. Radautsan, E.V. Russu, A.V. Simashkevich, V.V. Sobolev, A.Ye. Tsurkan, F.S. Shishiyanu, and S.D. Shutov were awarded the Moldavian SSR State Prize in Science and Technology for 1983.

After more than a quarter century it is safe to state that the ideas of N.A. Goryunova have received complete confirmation in many thousands of research works and are serving today the cause of the development of new promising materials for modern electronics.

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COOPERATION OF USSR, DPRK SOCIAL SCIENTISTS

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 86 pp 114-115

[Article by I.A. Surinov: "The Agreement on Scientific Cooperation Between the USSR Academy of Sciences and the DPRK Academy of Social Sciences"]

[Text] In recent years the contacts between social scientists of the Soviet Union and the Democratic People's Republic of Korea have been successfully developed. Korean scientists have taken part in conferences, symposiums, and other scientific measures, which have been conducted by the USSR Academy of Sciences. Groups of Soviet specialists--historians, philosophers, economists, literary scholars, and linguists--have traveled annually to Korea for the sharing of experience, consultations, and scientific work. Korean social scientists have visited the Soviet Union.

The experience showed that for the further development of fruitful ties it is necessary to have a legal basis, therefore, the USSR Academy of Sciences and the DPRK Academy of Social Sciences (AON) came to an understanding to sign the Agreement on Scientific Cooperation. The preliminary negotiations were held in Moscow in 1985, while in April 1986 a delegation of the USSR Academy of Sciences headed by Member of the Presidium of the USSR Academy of Sciences Academician V.N. Kudryavtsev visited Pyongyang. Negotiations with a delegation of the DPRK Academy of Socialist Sciences, which was headed by Vice President of the DPRK Academy of Social Sciences Academician Kim Chol-sik, were conducted.

The heads of the delegations signed the Agreement on Scientific Cooperation Between the USSR Academy of Sciences and the DPRK Academy of Social Sciences, the term of which is unlimited. The agreement envisages the extensive interaction of scientific institutions and the cooperation of academic publishing houses, libraries, and information centers.

It is stipulated by the agreement that the two academies will sign plans of specific cooperation for a term of not less than 1 year. The first such plan was signed for 1986-1988 at the same time as the signing of the agreement. In conformity with the plan cooperation will be developed in the area of history, philosophy, law, economics, and philology. If in the process of contacts a mutual interest in the conducting of joint work comes to light, for its

implementation the institutes of the corresponding type will sign specific working plans.

Already at the negotiations in Pyongyang the parties reached an agreement to begin the joint study of the laws of development of the neolithic cultures of Korea, Siberia, and Central Asia, the peculiarities of the Stone and Bronze Ages in Korea, the ideological struggle over the philosophical heritage of the peoples of the East, the experience of the legal education of citizens of the USSR and the DPRK, urgent problems of world economics and international relations, and the application of mathematical methods and computers in planning and management. Literary scholars will jointly elaborate the theme "The Image of the Communist in Soviet Literature and Literature of the DPRK," linguists will begin work on the preparation of the Large Russian-Korean Dictionary.

In order to make the necessary changes in the plan in good time, including the coordination of new themes of cooperation, the parties agreed to hold annually meetings of representatives of the academies. The negotiations in Pyongyang took place in a constructive comradely atmosphere, both delegations declared the aspiration of the academies to comprehensively broad and extend cooperation.

The delegation of the USSR Academy of Sciences visited scientific institutions and familiarized itself with historical and cultural sights of the country.

The held negotiations and the signed agreement and plan of cooperation between the USSR Academy of Sciences and the DPRK Academy of Social Sciences are new vivid evidence of the constantly expanding friendly relations between scientists of the Soviet Union and People's Korea.

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KAZAKH INTENSIFICATION-90 PROGRAM

Alma-Ata VESTNIK AKADEMII NAUK KAZAKHSKOY SSR in Russian No 10, Oct 86 pp 8-10

[Article: "On the Results of the Formulation of the Republic Territorial-Sectorial Program of the Intensification of the Economy of the Kazakh SSR During the 12th Five-Year Plan on the Basis of the Utmost Acceleration of Scientific and Technical Progress (Intensification-90)"]

[Text] In conformity with the decision of directive organs the Territorial-Sectorial Program of the Intensification of the Economy of the Kazakh SSR During the 12th Five-Year Plan on the Basis of the Utmost Acceleration of Scientific and Technical Progress (Intensification-90) has been formulated in the republic for the first time. The program was executed by the Institute of Economics of the Kazakh SSR Academy of Sciences as the main organization with the participation of ministries and departments, scientific institutions and organizations, including institutes of the Kazakh SSR Academy of Sciences, under the general methods supervision of the Kazakh SSR State Planning Committee.

The program reflects a qualitatively new approach to the accomplishment of the tasks of the socioeconomic development of the entire national economic complex of the republic. The goal of the program is the creation of the material prerequisites of the transition of the sectors of the national economy of Kazakhstan to the intensive stage of the economy.

The implementation of more than 6,000 scientific and technical measures with allowance made for the implementation of the most important all-union programs (the Food Program, the Energy Program, the Long-Term Program of Land Reclamation, the Comprehensive Program of the Development of Consumer Goods and Services for 1986-2000, the Comprehensive Program of Scientific and Technical Progress for 1986-2005) and 16 republic scientific and technical programs for the 12th Five-Year Plan with their results with respect to the saving of materials, manpower, and financial resources is envisaged in the program.

The program consists of 10 sections and encompasses the participation of the majority of enterprises and organizations of the entire planned group of ministries and departments of the Kazakh SSR, more than 50 associations and enterprises of union subordination (the Karaganda Metallurgical Combine, the

Karaganda Coal Production Association, the All-Union Association of the Phosphorus Industry, and others), 22 institutes of the Kazakh SSR Academy of Sciences (the Council for the Study of Productive Forces, the Institute of Metallurgy and Ore Dressing, the Institute of Chemistry and Metallurgy, the Institute of Organic Catalysis and Electrochemistry, and others), 13 higher educational institutions (Karaganda Polytechnical Institute, the Kazakh State University, Kazakh Polytechnical Institute, and others), 47 scientific research and experimental subdivisions of the Kazakh SSR State Agroindustrial Committee (the Kazselkhozmekhanizatsiya Scientific Production Association, oblast agricultural testing stations, and others), and more than 40 sectorial scientific research, planning, and design and technological organizations (the DNIPItsvetmet, the Kazavtotranstekhnika Scientific Production Association, the Kazakh State Institute for the Surveying and Planning of Communications Installations, the Kazakh State Institute for the Planning of Trade and Public Dining Enterprises, and others).

It is planned to obtain an economic impact from the introduction of all the assignments and measures of the program in the national economy. Moreover, the program envisages a significant saving of materials, fuel, and energy resources.

The accomplishment of the assignments of the program will make it possible during the 12th Five-Year Plan to ensure:

--a stable average annual growth of labor productivity of not less than 3.6 percent and as a whole for the five-year plan of 19.5 percent; the decrease of the product cost by 2.5-3 percent, or by 0.5-0.6 percent on the average in a year;

--the decrease of the materials-output ratio (excluding amortization) by 4.9 percent, or by nearly 1 percent a year;

--the improvement of the working conditions of workers.

In all 88 percent of the increase of the national income will be provided by the increase of the productivity of national labor, moreover, two-thirds of the increase of this basic indicator of production efficiency will be provided by the use of scientific and technical achievements.

The scientific institutions of the Kazakh SSR Academy of Sciences took an active part in the formulation of the program. The 54 most important assignment-measures, which were included in the Intensification-90 Program, were proposed by them and were accepted by the main developer. Of the total number of measures nearly half are aimed at the development and introduction of advanced technology. About 60 percent of the economic impact will be obtained due to these assignments.

The enterprises of the All-Union Association of the Phosphorus Industry, the enterprises of nonferrous metallurgy, and agriculture will receive a substantial economic impact from the introduction of the assignments being carried out the by Academy of Sciences.

Attaching great significance to the implementation of the Intensification-90 Program as an important condition of the acceleration of the process of the intensification of the economy in the republic, which stimulates "science-production" integration, the Presidium of the Kazakh SSR Academy of Sciences resolves:

1. To oblige the scientific institutions of the Academy of Sciences to ensure the unconditional fulfillment and introduction in practice of the assignment-measures, which have been included in the program, on the established dates and at a level which satisfies present requirements.

2. The academician secretaries of the departments of the Kazakh SSR Academy of Sciences are to take under constant control the progress of the fulfillment and introduction in production of the assignment-measures which have been included in the program.

3. To note the successful performance by the Institute of Economics of the Kazakh SSR Academy of Sciences of the functions of the main developer of the program, which made it possible to achieve the above-plan formulation of the program and its timely submitting to the coordinating council for scientific and technical progress attached to the Kazakh CP Central Committee, to the Kazakh SSR Council of Ministers, and to the Kazakh SSR State Planning Committee.

3.1. To pay bonuses to the board of directors of the Institute of Economics of the Kazakh SSR Academy of Sciences, which ensured the timely formulation of the Intensification-90 Program and the 1985 plan themes at a high level, as well as to the staff members who took a most active part in the development of the program.

4. To adopt the suggestion of the Kazakh SSR State Planning Committee on the formation of a sector within the Department of Complex Problems of Scientific and Technical Progress of the Institute of Economics of the Kazakh SSR Academy of Sciences for the conducting of research, which is connected with the program, and the fulfillment of work on the specification and improvement of the program, as well as for the carrying out of the overall monitoring of its implementation.

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ROBOT INTERBRANCH SCIENTIFIC TECHNICAL COMPLEX

Moscow TEKHNIKA I NAUKA in Russian No 11, Nov 86 pp 5-8

[Interview with Doctor of Technical Sciences Professor Vasiliy Sergeyevich Belov, general director of the Robot Interbranch Scientific Technical Complex and director of the Experimental Scientific Research Institute of Metal-Cutting Machine Tools of the Ministry of the Machine Tool and Tool Building Industry, by TEKHNIKA I NAUKA correspondent O. Tatevosyan under the rubric "Scientific and Technical Progress: Experience, Problems, Research": "The Robot Interbranch Scientific Technical Complex: The Year of Formation"; date, place, and occasion not given; first two paragraphs are TEKHNIKA I NAUKA introduction]

[Text] The first 16 interbranch scientific technical complexes were established a year ago. The time is short, if you bear in mind the scale of the matter, for the sake of which they were organized. But it is already possible to judge from the first results whether acceleration, at which the 27th party congress aimed all of us, has been achieved.

Our journal will tell regularly about the activity of these complexes. And the first publication is about the formation of the Robot Interbranch Scientific Technical Complex. Doctor of Technical Sciences Professor V.S. Belov, general director of the complex and director of the Experimental Scientific Research Institute of Metal-Cutting Machine Tools of the Ministry of the Machine Tool and Tool Building Industry, tells our correspondent O. Tatevosyan about this.

[Question] First, Vasiliy Sergeyevich, I would like to find out what organizational principles were made the basis for the complexes? What tasks have been set for them?

[Answer] In essence, the establishment of interbranch scientific technical complexes is the practical realization of the goal program method in the management of the national economy, which has been well known to all of us for ages. Unfortunately, it was used quite timidly when solving the intersectorial problems of the development of science and technology, although its effectiveness never aroused anyone's doubt. It is worth pointing out, perhaps, just the formulation in recent years of statewide scientific and technical programs under the aegis of the State Committee for Science and

Technology, the State Planning Committee, and the USSR Academy of Sciences. But in this case it was also a question primarily of the monitoring of the fulfillment of what had been outlined. Management here in the strict sense of the word did not exist.

Interbranch scientific technical complexes, as is emphasized in the Basic Directions, which were approved by the 27th party congress, have been established in the most important directions of scientific and technical progress. In the majority of them, which were formed in December of last year, academic scientific institutions were appointed as the main organization. Sectorial institutes, such as, for example, the Experimental Scientific Research Institute of Metal-Cutting Machine Tools in the Robot Interbranch Scientific Technical Complex, act in this capacity.

The established relations between scientific, design, and production subdivisions of various sectors, the USSR Academy of Sciences, and the higher school, which existed for many years, were confirmed by directive in many complexes. The interrelations between them, however, bound the participants in joint development in hardly any way. Now in all issues, which belong to the competence of the interbranch scientific technical complex, the general director of the complex and the main developing organization enjoy the right of the deciding vote. In other words, the decisions of the management of the interbranch scientific technical complex are obligatory for all its participants.

The effective combination of fundamental, basic, and applied research with experimental design development is at the basis of the activity of the interbranch scientific technical complex. The ultimate goal is the establishment of base models of equipment or technologies, which are capable of bringing about a revolution in social production.

The corresponding financial assets for the conducting of research and development on the corresponding themes are specially placed at the disposal of the managers of the complex.

I will name several interbranch scientific technical complexes, just from the name of which it is possible to judge what problems they are called upon to solve: Biogen, Petroleum Recovery, Catalysis, Technological Lasers, Personal Computers, Robot.... A task--the acceleration of the pace of progress in its field of science and technology--has been set for each complex. What should this acceleration be as compared with yesterday's? It is hardly possible to find criteria for such a comparison. Past experience is not suitable as a base analog, since we did not have, in essence, practice in such planning and a goal-oriented approach to the problem. And, I believe, it would not be worth recognizing the attainment of the world level as the ultimate goal. The task is not so much to catch up with as to lead the world level. The chaser is always behind and sees the back of the one with whom he is trying to catch up. We must move at least evenly. How is this to be achieved? Everything will depend on the talent, devotion to the cause, and dedication of each researcher and designer and on the organization of the matter.

[Question] And all the same would it probably be possible to consider the achievement of the existing world level in robotics a significant success?

[Answer] This is not entirely the case. In our industry there are many models which are not inferior to the world level. We became convinced of this when within the framework of the interbranch scientific technical complex at the beginning of this year they held at the UkrNIISIP (Odessa) a unique exhibition and review of all the manipulators which had been developed in our country by the beginning of the current five-year plan. There turned out to be tens of types of them. Far from all of them had achieved the world technical level. But the best ones are quite capable of laying claim to the standard. And it is good that during the review the producers from several industrial sectors made the decision to remove from production several tens of robotic devices as ones which do not satisfy the present requirements. Moreover, they did so voluntarily, without any coercion. They had simply seen for themselves that today in our country it is possible and necessary to do better.

And we, the managers of the Robot Interbranch Scientific Technical Complex, were also convinced of something. Of the fact, for example, that the most important task for us today is the formulation and implementation in robot building of a unified technical policy. We included it in the plans--both annual and five-year--as the first paragraph. The priority technical tasks are the development of robotic devices for the attendance of metal-cutting machine tools, forge-and-press and metallurgical equipment, for the automation of assembly, painting, arc and spot welding, and so forth. But this is only the first stage. Already this year the collective of researchers has done much work on the determination of the most advisable areas of the use of robotics and the long-range needs for it on the scale of the national economy and for the formulation of the technical demands on robots for the most diverse purposes. This task, incidentally, has been coordinated with the needs of the Interrobot Program, which is being fulfilled within the framework of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries (our journal told about it in No 6, 1986).

[Question] The present interbranch scientific technical complexes are compared at times with the atomic and space projects, which were implemented during the first postwar decades. Which of the organizational principles, which were achieved by these predecessors, can be used?

[Answer] Many. The precise planning of targets, the rigid schedule of stages of the work, and their constant coordination. The interbranch scientific technical complexes should serve the rapid technical and technological breakthrough to the future.

True, the present complexes do not have such possibilities.

[Question] What do you mean? What problems face the Robot and other complexes?

[Answer] A reliable production base, for example, does not exist at all the interbranch scientific technical complexes. Many managers of various

enterprises and departments have spoken about its necessity. Today the problem of material and technical supply is also arousing definite anxiety. There is no doubt that for the complexes it should be priority, immediate supply. Incidentally, it is also recorded that way in the Statute on the Interbranch Scientific Technical Complex. But for the present the system of supply remains traditional--through sectorial organs. Hence, our plans will depend to a considerable degree on the efficiency, promptitude, and responsibility of the supply subdivisions.

We also have problems with the selection of personnel. For the goals, which have been set for the interbranch scientific technical complex, require in conformity with the scale of the matter that the most highly skilled specialists be enlisted. When speaking about the needs of the complexes, one should, in essence, pose the question of the redistribution of personnel. Alas, such questions are not settled by directive.

Here is an example of the usual difficulties. We planned to close at the Experimental Scientific Research Institute of Metal-Cutting Machine Tools the second robotics department. The first has existed for nearly 10 years. Its collective is capable today of solving important problems. But its formation took years. But such time is not being allotted for the establishment of a new department--everything must be done promptly, rapidly. Of course, assets for the enlistment of highly skilled specialists are at the disposal of the managers of the interbranch scientific technical complex. But this matter is a subtle and delicate one, which requires attention and careful weighing. Time is passing. Moreover, a good specialist, wherever he works, does not dash headlong into a new job. He is, after all, accustomed to and likes his old place.

I will tell about a fact of a different sort. Within our complex there is the Odessa UkrNIISIP. It belongs to the second category of scientific institutions (the category, as is known, is determined mainly on the basis of the size of the collective). A large amount of work is now being assigned to this subdivision of the complex. A testing ground should be established here. And the size of the institute will increase substantially. But so that it would increase due to highly skilled specialists, it is necessary to transfer it to the first category already now! The level of the remuneration of labor, as is known, depends on the category. In a city of 1 million with highly developed science and industry it is not so difficult for specialists in electronics, remote control, and robotics to find a job to their liking. And given such competition we will have difficulty in finding good engineers. I hope that the State Committee for Labor and Social Problems and other interested departments will agree with us.

In short, conditions of the maximum favoring are necessary in the interrelations of complexes with various departments. Only in case of such an approach will the interbranch scientific technical complexes be able to accomplish the important tasks which have been assigned to them.

[Question] Which scientific organizations have become a part of the Robot Interbranch Scientific Technical Complex? How are the relations between them forming?

[Answer] Within the complex there are more than 10 different organizations. Of course, all of them are of a different level. For example, two academic institutes--the Institute of Machine Science and the Institute of Information Transmission Problems--have been included in it. They are carrying out not only basic research, but also specific applied developments. The VUZ sector of science is associated with them. These are the Institute of Mechanics attached to Moscow State University imeni M.V. Lomonosov, the Institute of Robotics and Technical Cybernetics attached to Leningrad Polytechnical Institute, and the Moscow Institute of Machine Tool and Tool Building. Incidentally, an affiliate of one of the chairs of the Institute of Machine Tool and Tool Building is being opened at the Experimental Scientific Research Institute of Metal-Cutting Machine Tools. This is being done not only for the purpose of bringing the VUZ scientific potential closer to production, but also to acquaint the students--future engineers, designers, and researchers--with the creative process. We hope that the impact of such cooperation will not be a long time coming.

A number of sectorial scientific production associations and scientific research institutes of the Ministry of Instrument Making, Automation Equipment, and Control Systems, the Ministry of the Machine Tool and Tool Building Industry, the Ministry of the Automotive Industry, the Ministry of Heavy and Transport Machine Building, and the Ministry of the Electrical Equipment Industry are working in our complex. They are determining the needs of their sectors for robots and the promising areas of the exertion of efforts for our future items and are cooperating in the making of prototypes. The first of them, the development of which was begun back before the establishment of the interbranch scientific technical complex by the same coperformers, was already successfully tested this year. Our department of robotics designed the mechanical part for the M 20 robot, while the Leningrad Lenelektronmash Scientific Production Association designed the control unit. The manipulator is intended for the assembly and loading of machine tools.

Within the interbranch scientific technical complex there are also base enterprises. First of all, the experimental works of the Experimental Scientific Research Institute of Metal-Cutting Machine Tools itself. But the future series-producing works have also been designated--the Mukachevo Plant imeni Kirov and the Sterlitamak Plant of the Ministry of the Machine Tool and Tool Building Industry, which at the stage of research and development are also quite capable of serving as the experimental base of the Robot Interbranch Scientific Technical Complex.

It is necessary to specially emphasize the fact that no former functions and duties of the member organizations of complexes are being abolished in connection with their inclusion in interbranch scientific technical complexes. The Experimental Scientific Research Institute of Metal-Cutting Machine Tools both was the leading sectorial scientific institution for the development of the latest models of metal-cutting machine tools and remains it, bearing full responsibility to its ministry. The VNIIelektrotransport of the Ministry of the Electrical Equipment Industry, which is located in Kaliningrad, both dealt with all the questions of the development of off-track vehicles before becoming a part of the Robot Interbranch Scientific Technical Complex and

should also deal with them now. However, within the interbranch scientific technical complex each organization becomes a coperformer of the theme which is of great national economic importance. Hence the conclusion: the problems, which have been posed by the management of the interbranch scientific technical complex for the coperformers, should receive priority over all others.

[Question] Is this realistic, Vasiliy Sergeyevich? Will not departmental interests gain the upper hand? On "that side" there are the traditional and customary hierarchy of authority, perennial contacts, and even personal relations. On this side there is only the Statute on the Interbranch Scientific Technical Complex. The economic influence of the interbranch scientific technical complex on the coperformer, perhaps, also simply does not compare with the influence of the headquarters of the sector. The latter on this level has far greater possibilities.

[Answer] We are obliged to reject such an approach--"on that side, on this side." All our work is in the interests of the national economic complex and the economy of the country. Does the same Ministry of Heavy and Transport Machine Building or another department of the machine building type really not need reliable robots? For our complex was established precisely in order to meet the needs of all machine building sectors for this equipment. Moreover, it was established because these needs are vital and urgent, otherwise no one would, as they say, make an unnecessary fuss.

I believe, however, that the apprehensions voiced by us are also not without grounds. But I hope that it is possible and necessary to aim the matter in the correct direction, by relying on the rights and powers, which have been granted by the Statute on the Interbranch Scientific Technical Complex. The management of the complexes has the opportunity to nip in the bud the attempts to slight the assignments of the interbranch scientific technical complexes up to the raising of the question of removing one performer or another from the job. We will strive to do everything possible so that the priority of the complex would remain unshakable. Both in matters of the rapid development of the necessary assemblies, units, and parts and in supply and other organizational affairs.

I keep touching upon the problem of supply, because it seriously worries us. Especially in the matter of supplying complete sets. Apparently, other interbranch scientific technical complexes are also experiencing the same difficulty. Let us imagine a situation: the Robot Interbranch Scientific Technical Complex needs a microcircuit with specific parameters. We turn to the appropriate member of the complex. It does not have such a circuit. We issue a technical assignment--to develop it by a certain date. And for the fulfillment of this assignment it may need certain materials and components from outside. But they, it turns out, also do not exist. In short, having followed the entire chain, you are held up by sand. I am speaking not figuratively, but in the direct sense. I myself once had occasion to hear: in our country, they say, there is no sand with such parameters, therefore, in the immediate future it is impossible to ensure the required supply of complete sets. I believe that excuses of this sort are inadmissible.

[Question] And in conclusion of the interview, Vasiliy Sergeyevich, tell me about the immediate plans of the Robot Interbranch Scientific Technical Complex and about the technical tasks facing the specialists of the complex.

[Answer] We are planning during this five-year plan to develop 20 promising models--the forefathers of entire systems of industrial robots. A products list, a classifier of ranges of models, testing methods, and a system of comparison with the level achieved in the world are being developed. A specific materials- and power-output ratio is being established for each system. The approach to components is also exactly the same: the electric, pneumatic, and hydraulic drives, the control systems, and the sensitizing elements should conform to strictly specified technical parameters.

The Machine Reliability Interbranch Scientific Technical Complex, which is headed by the Institute of Machine Science of the USSR Academy of Sciences and, in turn, performs the role of a coperformer in the Robot Interbranch Scientific Technical Complex and to which the formulation of the qualitative technical parameters of products of machine building has been assigned, has established for robots the indicator of reliability--a mean time between failures of 2,500 hours and a speed of operating manipulations of 1.5-3 meters per second. Are the parameters realistic? For the mechanical part they are without a doubt. But for the electronics it is a different matter. The electronic stuffing of robots for the present does not ensure such reliability. But it also makes the mechanical unit a robot.

We are "teaching" our items, for example, remote control and optical "literacy." The following example is for clarity. Various parts are arranged on a conveyor or on an assembly table without a particular order. The robot should select among them the necessary one, take it and install it in a strictly specified place. It is also necessary to solve, as specialists say, the problem of sensitization. It is necessary to take a crystal vase with one gripping force and a part made of a solid piece of steel weighing 100 kilograms with another. It is necessary to turn one bolt with a force of 2-3 kilograms and another with a force of 10 kilograms and more. The manipulator, which performs such operations, should have a specific "threshold sensitivity." The electronics and the control microcircuit ensure it. And it should conform to the parameters of reliability, which have been established for the items which are being developed by our interbranch scientific technical complex. We are also posing the following task for the members of our complex, which are developing electronics: in the next year or 2 to develop reliable control units with a no-failure life of 2,500 hours.

These plans are mandatory for all the coperformers of the Robot Interbranch Scientific Technical Complex.

Although it would be helpful to regard the first year--the year of formation of the complex--as the age of infancy, we attempted to approach the matter without vacillation. The scale of reorganization does not give us the right to delay. Along with automation and computerization, the robotization of social production is one of the three whales, on which scientific and technical progress in the present era is based. The growth rate of the entire economy depends to a significant degree on the development of the machine

building complex. The acceleration of this rate is the most important requirement of the party at the present stage. It is mandatory for everyone.

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LANDAU PRIZE AWARDED TO B.I. SHKLOVSKIY, A.L. EFROS

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 86 pp 110-111

[Article: "The L.D. Landau Prize to B.I. Shklovskiy and A.L. Efros"]

[Text] The Presidium of the USSR Academy of Sciences has awarded the 1986 L.D. Landau Prize to Doctor of Physical Mathematical Sciences Boris Ionovich Shklovskiy and Doctor of Physical Mathematical Sciences Aleksey Lvovich Efros (the Physical Technical Institute imeni A.F. Ioffe of the USSR Academy of Sciences) for the series of works "Coulomb Interaction and Transfer in Disordered Systems With Localized States."

The series of works, which was awarded the prize, cites the result of many years of research of the authors in the field of the kinetics of disordered systems with localized electrons. They actually developed a new section of physical kinetics, which makes it possible to describe systems, which are being studied extensively at present and are important for practical applications: doped, amorphous, and vitreous semiconductors. B.I. Shklovskiy and A.L. Efros were the first to apply "flow theory" to problems of the kinetics of localized electrons. At a high-quality level they ascertained the role of interelectron interaction and showed that it is decisive for the structure of the energy spectrum and kinetics of electrons which are localized in strongly disordered systems. The authors constructed the theory of hopping conduction--the basic mechanism of low-temperature transfer in weakly doped semiconductors, having revealed a picture of the phenomena for a large number of physical situations (temperature intervals, a magnetic field, an anisotropic energy spectrum, and so on). The universal conclusion of the formation of a "pseudoslot" in the density of states in the vicinity of the Fermi level and of the screening of large-scale fluctuations of the Coulomb potential by localized electrons in strongly doped compensated semiconductors was obtained.

The series of works of B.I. Shklovskiy and A.L. Efros is an important stage in the development of the electron theory of disordered systems and has received recognition both in our country and abroad.

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ROZHDESTVENSKIY PRIZE AWARDED TO S.G. RAUTIAN

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 86 p 112

[Article: "The D.S. Rozhdestvenskiy Prize to S.G. Rautian"]

[Text] The Presidium of the USSR Academy of Sciences has awarded the 1986 D.S. Rozhdestvenskiy Prize to Corresponding Member of the USSR Academy of Sciences Sergey Glebovich Rautian for the series of works "Research in the Field of Nonlinear Spectroscopy."

The notions of the interaction of radiation with matter, which formed in optics and spectroscopy, after the appearance of lasers required substantial modification and extension. The development of these notions led to the establishment of a new direction--nonlinear optics and spectroscopy. The works of S.G. Rautian made a large contribution to its formation and development. He developed the basic theoretical methods of describing the effect of monochromatic light on gaseous media, which take into account the processes of relaxation, the thermal motion of particles, their collision, and so forth. The method of the test field for the recording of changes in a medium, which are caused by the effect of strong radiation, was proposed. At present this method has become the basic experimental method of the nonlinear spectroscopy of not only gaseous, but also condensed media.

In the works of S.G. Rautian a number of new effects and phenomena, including the onset of narrow resonances of a specific nature (with an identical width of lines), interference effects, collision resonances, and the triplet of the line of resonance scattering, were predicted and detected. He made a large contribution to the theory of interatomic collisions.

The ideas developed by S.G. Rautian have found extensive application in nonlinear spectroscopy and laser physics and engineering. The results of his work are being used in many monographs and textbooks and have earned international recognition.

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ANDRONOV PRIZE AWARDED TO A.A. PERVOZVANSKIY

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 86 pp 112-113

[Article: "The A.A. Andronov Prize to A.A. Pervozvanskiy"]

[Text] The Presidium of the USSR Academy of Sciences has awarded the 1986 A.A. Andronov Prize to Doctor of Technical Sciences Anatoliy Arkadyevich Pervozvanskiy (Leningrad Polytechnical Institute imeni M.I. Kalinin of the RSFSR Ministry of Higher and Secondary Specialized Education) for the series of works "Decomposition and Aggregation in the Control of Large Systems."

A.A. Pervozvanskiy has made a large contribution to the solution of the urgent problems of decomposition and aggregation, which are very essential for the theory of large controlled systems. The idea of his research consists in the consideration of the fact that drastic differences of the intensities of contacts and the speeds of processes, which are reflected by the existence of small parameters in mathematical models, are characteristic of real large systems. A.A. Pervozvanskiy and his associates systematically developed the system of the method of the small parameter in problems of optimal control, which naturally leads to suboptimal algorithms of decomposition and aggregation. The scientific direction, which was commenced by the works of A.A. Pervozvanskiy, is being successfully developed.

The results of the series of works of A.A. Pervozvanskiy were used in the scientific research conducted at Leningrad Polytechnical Institute. The overall economic efficiency from their introduction exceeds 1.2 million rubles a year.

The series of works of A.A. Pervozvanskiy develops the traditions of the school of Academician A.A. Andronov and demonstrates the effectiveness of its ideas in the solution of modern problems--the formulation of the laws of the control of complex systems.

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IGOR VASILYEVICH GORYNIN

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 86 pp 108-109

[Article: "Academician I.V. Gorynin Is 60 Year Old"]

[Text] The scientific activity of Lenin and USSR State Prize winner Igor Vasilyevich Gorynin, a prominent scientist in the field of the physics of metals, materials science, and the technology of inorganic materials, is devoted to the study of phase transformations, the peculiarities of the formation of the dislocation structure, and the physical principles of the strength and plasticity of a wide range of metallic materials.

This research was the scientific basis of the development of a number of brands of steel and alloys based on iron, aluminum, titanium, tungsten, molybdenum, niobium, and other metals and advanced methods of their commercial production and welding for complex engineering structures for the development of the world ocean.

I.V. Gorynin made a substantial contribution to the elaboration of the principles of alloying and structure control, which made it possible to develop new composites of construction materials with special physical chemical and mechanical properties for the production of equipment of nuclear electric power plants. A significant series of his works is devoted to studies of the radiation resistance of construction materials and the evaluation of their serviceability under the conditions of the operation of nuclear electric power plants.

I.V. Gorynin is performing much scientific organizational, teaching, and public work. He is a member of the Presidium of the Leningrad Scientific Center of the USSR Academy of Sciences, chairman of the Coordinating Council of the USSR Academy of Sciences and the USSR State Committee for the Utilization of Atomic Energy for the Problem "The Study and Development of Construction Materials for Thermonuclear Reactors," and head of a chair of Leningrad Polytechnical Institute.

The Presidium of the USSR Academy of Sciences sent the celebrator a salutatory address, in which, having noted his scientific services, wished him creative successes in his diverse activity.

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YURIY SERGEYEVICH OSIPOV

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 86 p 109

[Article: "Corresponding Member of the USSR Academy of Sciences Yu.S. Osipov Is 50 Years Old"]

[Text] For services in the development of applied mathematics and mechanics and the training of scientists Corresponding Member of the USSR Academy of Sciences Yuriy Sergeyevich Osipov by the Ukase of the Presidium of the USSR Supreme Soviet of 24 July 1986 was awarded the Order of Labor Red Banner.

The basic research of Lenin Prize winner Yu.S. Osipov made a large contribution to the mathematical theory of control processes. Already in his first works on the spectral theory of the stabilization of the motions of stationary and periodic systems with a lag he obtained effective conditions of the stabilizability of the object and constructed an analog of Lyapunov's stability theory on first approximation and in critical cases.

The works of Yu.S Osipov on control theory found extensive recognition. He constructed a complete theory of control of multidimensional systems according to the principle of feedback under the conditions of uncertainty.

In recent years Yu.S. Osipov has been developing a new approach to the construction of computational algorithms, which work in real time under the conditions of incomplete and changing information about the data of the problem. A number of important basic and applied studies, which have been introduced in practice, have been conducted under this supervision.

Along with scientific activity Yu.S. Osipov is devoting much effort and energy to the training of highly skilled scientists. He is performing much scientific organizational work, being a member of the USSR National Committee for Theoretical and Applied Mechanics.

The Presidium of the USSR Academy of Sciences sent the celebrator a salutatory address, in which it wished him good health and new creative successes for the good of our great homeland.

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BRIEFS

SAGDEYEV IS HERO OF SOCIALIST LABOR--For a large contribution to the realization of the Venus-Halley's Comet International Project the title of Hero of Socialist Labor was conferred by the Ukase of the Presidium of the USSR Supreme Soviet of 8 September 1986 on Roald Zinnurovich Sagdeyev, director of the Institute of Space Research of the USSR Academy of Sciences, with the presentation to him of the Order of Lenin and the Sickle and Hammer Gold Medal. [Text] [Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 86 p 108] 7807

N.D. DEVYATKOV AWARDED POPOV GOLD MEDAL--The Presidium of the USSR Academy of Sciences has awarded the 1986 A.S. Popov Gold Medal to Academician Nikolay Dmitriyevich Devyatkov for the series of works "Outstanding Scientific Works and Inventions in the Field of Radioelectronics." A significant portion of these works, which pertain to vacuum microwave electronics, ensured its formation and attainment of the world level. The most outstanding scientific works and inventions of N.D. Devyatkov have been embodied in microwave triodes and triode generators of new types, which in their day substantially led the world level, in double-resonator and reflex klystrons, and in the assimilation of the millimeter and submillimeter bands of electromagnetic waves. The pioneering works of N.D. Devyatkov on the study of the biological effects, which stem from the action of weak microwave fields on living matter, are of great importance. [Text] [Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 86 p 110] 7807

POPOV PRIZE AWARDED TO YA.N. FELD--The Presidium of the USSR Academy of Sciences has awarded the 1986 A.S. Popov Prize to Doctor of Technical Sciences Yakov Naumovich Feld for the series of works "The Elaboration of General Methods of Studying the Diffraction, Scattering, and Excitation of Electromagnetic Waves and the Theory of Receiving and Transmitting Systems." The basic works of Ya.N. Feld, which were awarded the prize, contain a number of outstanding theoretical results of general electrodynamics (the generalization of reciprocity theorems, the duality principle, and the method of variation of parameters, the elaboration of methods of solving boundary problems) and the theory of the analysis and synthesis of receiving and transmitting antennas. The majority of these works are fundamental and classical ones, which have received world recognition. The works of Ya.N. Feld have found extensive application in antenna engineering and in the solution of a number of practical problems of microwave electrodynamics. Many

devices in the field of antenna engineering and the propagation of radio waves, which appeared as a result of the experimental design development which was performed under the supervision of Ya.N. Feld and with his direct participation, are based on the results obtained by him. [Text] [Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 86 p 111]

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BIOGRAPHICAL INFORMATION

NIKOLAY NIKOLAYEVICH SEMENOV OBITUARY

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 86 pp 90-91

[Article: "Nikolay Nikolayevich Semenov"]

[Text] Soviet science has suffered a grave loss. On 25 September 1986 Academician Nikolay Nikolayevich Semenov, an outstanding scientist, one of the founders of modern chemistry, a prominent organizer of Soviet science, a CPSU member, a member of the Presidium of the USSR Academy of Sciences, and twice Hero of Socialist Labor, died at the age of 90.

An entire era in Soviet and world science is connected with the name of N.N. Semenov, he developed the general theory of chain chemical reactions and the theories of combustion and explosion processes. The research and the ideas advanced by N.N. Semenov determined the course of development of the new field of science, which he created--chemical physics.

N.N. Semenov was born on 15 April 1896 in Saratov. After graduating in 1917 from the Physical Mathematical Faculty of Petrograd University he began scientific work at the State Physical Technical X-Ray Institute. In 1931 on the basis of the sector of this institute, which N.N. Semenov managed, the Institute of Chemical Physics of the USSR Academy of Sciences, of which Academician N.N. Semenov was director for more than half a century, was established.

For a series of works in the field of the mechanism and kinetics of chain chemical reactions in 1929 N.N. Semenov was elected a corresponding member of the USSR Academy of Sciences, while in 1932 he was elected a full member of the USSR Academy of Sciences. The research of Academician N.N. Semenov found extensive application in the national economy and made a significant contribution to the strengthening of the defensive capability of the country.

N.N. Semenov was one of the prominent organizers of Soviet science, he was elected academician secretary of the Chemical Sciences Department of the USSR Academy of Sciences and vice president of the USSR Academy of Sciences. From 1957 to the end of his life he was a member of the Presidium of the USSR Academy of Sciences.

N.N. Semenov combined much scientific research work with the training of scientists and was one of the initiators of the establishment of the Moscow Physical Technical Institute, generations of Soviet scientists studied at his school.

The scientific activity of N.N. Semenov received extensive international recognition. He was a Nobel Prize winner and a member of many foreign academies, universities, and scientific societies. The social journalist works of N.N. Semenov on philosophical and social problems of science are of great importance.

The public political activity of N.N. Semenov was diverse. He was elected a candidate member of the CPSU Central Committee and a deputy of the USSR Supreme Soviet and for a number of years supervised the work of the All-Union Society for Knowledge.

The services of N.N. Semenov were appreciated by the Communist Party and the Soviet state. The title of Hero of Socialist Labor was twice conferred on him, he was awarded nine Orders of Lenin, the Orders of the October Revolution and Labor Red Banner, and other decorations. The Lenin Prize, USSR State Prizes, and the highest decoration of the USSR Academy of Sciences--the M.V. Lomonosov Gold Medal--were awarded to him.

Dedicated service to science and the Soviet people won N.N. Semenov deserved respect and authority. The blessed memory of the outstanding Soviet scientist Nikolay Nikolayevich Semenov will remain forever in the hearts of the Soviet people.

[Signed] M.S. Gorbachev, G.A. Aliyev, V.I. Vorotnikov, A.A. Gromyko, L.N. Zaykov, D.A. Kunayev, Ye.K. Ligachev, N.I. Ryzhkov, M.S. Solomentsev, V.M. Cherbikov, E.A. Shevardnadze, V.V. Shcherbitskiy, P.N. Demichev, V.I. Dolgikh, B.N. Yeltsin, N.N. Slyunkov, S.L. Sokolov, Yu.F. Solovyev, N.V. Talyzin, A.P. Biryukova, A.F. Dobrynin, M.V. Zimyanin, V.A. Medvedev, V.P. Nikonov, G.P. Razumovskiy, A.N. Yakovlev, A.P. Aleksandrov, G.I. Marchuk, V.K. Gusev, V.A. Kotelnikov, Ye.P. Velikhov, V.A. Koptyug, A.A. Logunov, Yu.A. Ovchinnikov, P.N. Fedoseyev, K.V. Frolov, A.L. Yanshin, V.A. Grigoryev, G.K. Skryabin, V.V. Bakhirev, Yu.A. Bespalov, V.A. Bykov, N.V. Lemayev, N.M. Olshanskiy, Ye.P. Slavskiy, G.A. Yagodin, A.A. Bayev, N.N. Bogolyubov, N.M. Zhavaronkov, M.A. Markov, A.M. Prokhorov, A.V. Fokin, I.A. Glebov, V.A. Ambartsumyan, N.G. Basov, B.Ye. Paton, V.I. Goldanskiy, Ya.B. Zeldovich, Ya.M. Kolotyrkin, I.M. Frank, P.A. Cherenkov, Yu.B. Khariton, M.V. Alfimov, E.F. Oleynik

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ALEKSANDRA VASILYEVNA NOVOSELOVA OBITUARY

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 86 pp 92-93

[Article: "Aleksandra Vasilyevna Novoselova"]

[Text] Soviet science and higher education have suffered a grave loss. On 27 September 1986 Academician Aleksandra Vasilyevna Novoselova, a most prominent scientist in the field of inorganic chemistry and semiconductor materials science, a professor of the Chemistry Faculty of Moscow State University imeni M.V. Lomonosov, winner of the USSR State Prize, and Hero of Socialist Labor, died at the age of 86.

The works of A.V. Novoselova made a substantial contribution to the development of domestic inorganic chemistry, particularly of beryllium, and the chemistry of fluoride compounds of metals. The establishment of new directions of modern chemical science--solid-state chemistry and domestic semiconductor materials science--is connected with the numerous studies of A.V. Novoselova and her scientific school.

A.V. Novoselova was born on 24 March 1900 in the village of Verezino of Kashinskiy Rayon of Kalinin Oblast. After graduating from secondary school in Rybinsk (now the city of Andropov) she began her working life as an educator in a children's home. In 1925 she graduated from the Natural Sciences Department of the Physical Mathematical Faculty of Moscow University and on the representation of the honored Academician I.A. Kablukov was admitted to graduate studies. Subsequently the entire life of A.V. Novoselova was connected with the Chemistry Faculty of Moscow University. The organizing abilities of A.V. Novoselova were vividly displayed during the period of construction of the new building of Moscow University, when she was dean of the Chemistry Faculty. Until her last days A.V. Novoselova supervised the laboratories of inorganic synthesis and heterogeneous equilibriums and of semiconductor chemistry and physics and carried out the organization and coordination of scientific research in the field of semiconductor chemistry as chairman of the Scientific Council of the USSR Academy of Sciences for the Problem "The Physical Chemical Principles of Semiconductor Materials Science."

The scientific activity of A.V. Novoselova received extensive recognition and won appreciation. In 1953 A.V. Novoselova was elected a corresponding member and in 1970 a full member of the USSR Academy of Sciences. In 1948 the

research of A.V. Novoselova on the chemistry of beryllium and in 1981 her works in the field of the chemical thermodynamics of semiconductors were commended with USSR State Prizes.

An educator by vocation, A.V. Novoselova devoted much effort to the training of the young generation of scientists of the country.

The public activity of A.V. Novoselova was diverse. She was elected a deputy of the Moscow Oblast Soviet and was a member of the editorial boards of many scientific journals of the USSR Academy of Sciences, chairman of the scientific council of the Inorganic and Analytical Chemistry Department of the Chemistry Faculty of Moscow State University, and a member of the Board of the Society for Knowledge.

The services of A.V. Novoselova were appreciated by the Communist Party and the Soviet state. The title of Hero of Socialist Labor was conferred on her and she was awarded three Orders of Lenin, the Order of the October Revolution, and many medals.

The blessed memory of the most prominent Soviet chemical scientist Aleksandra Vasilyevna Novoselova will remain forever in the hearts of the Soviet people.

[Signed] The Presidium of the USSR Academy of Sciences, the USSR Ministry of Higher and Secondary Specialized Education, the Physical Chemistry and Technology of Inorganic Materials Department of the USSR Academy of Sciences, Moscow State University imeni M.V. Lomonosov

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GAKASH ZAKIYEVICH BIYASHEV

Alma-Ata VESTNIK AKADEMII NAUK KAZAKHSKOY SSR in Russian No 10, Oct 86 p 77

[Article: "The 80th Birthday of Academician of the Kazakh SSR Academy of Sciences G.Z. Biyashev"]

[Text] On 10 October 1986 Academician of the Kazakh SSR Academy of Sciences Gakash Zakiyevich Biyashev, a doctor of agricultural sciences, professor, honored figure of science of the Kazakh SSR, and CPSU member since 1958, turned 80.

G.Z. Biyashev is the founder of the genetics and breeding of plants in Kazakhstan. The scientific and public activity of G.Z. Biyashev is closely connected with the development of biological science in general and in particular with the organization and conducting of scientific research on genetics and breeding. After completing graduate studies at the All-Union Scientific Research Institute of Cotton Growing (Tashkent) and successfully defending his candidate dissertation in 1936, he dealt for several years with the study of the influence of the structure of the top soil, the size of aggregates, and the density of their texture on the water-holding capacity of soil and studied the influence of the depth of plowing on the physical properties of soil and the yield of cotton. These works were rated highly and were included in the compendium of Professor A.A. Rods "Pochvennaya vlaga" [Soil Moisture], which was published in 1952. In 1939 G.Z. Biyashev on the invitation of the Kazakh Scientific Research Institute of Agriculture imeni V.R. Vilyams moved to Alma-Ata and began a series of works on the study of a set of techniques, which are aimed at the obtaining of high and stable yields of sugar beets on irrigated lands. The results of these works were reflected in the monograph "Kultura sakharnoy svekly v Kazakhstane" [The Sugar Beet Crop in Kazakhstan] and in his doctoral dissertation.

From 1948 to 1965 G.Z. Biyashev was head of the Chair of Darwinism and Genetics of the Kazakh State University imeni S.M. Kirov and from 1965 to the present has been a professor of the chair. From 1952 to 1957 G.Z. Biyashev was dean of the Biology Faculty. In 1954 G.Z. Biyashev was elected a corresponding member of the Kazakh SSR Academy of Sciences. In 1957 after the organization in Kazakhstan of the Kazakh Academy of Agricultural Sciences G.Z. Biyashev became one of its first full members and vice president for plant growing. A number of forms of sugar beets, which were developed by G.Z.

Biyashev and associates, successfully underwent regional strain testing, while the strain Kazakhskiy poligibrid 24 was regionalized in the beet-growing oblasts of the republic.

From 1965 to 1978 G.Z. Biyashev was director of the Institute of Botany of the Kazakh SSR Academy of Sciences. In this position he contributed in many ways to the development of new directions in biology, while simultaneously strengthening the scientific and material base of botanical research.

In 1967 G.Z. Biyashev was elected a full member of the Kazakh SSR Academy of Sciences.

G.Z. Biyashev did and is doing much in the matter of training skilled scientists. G.Z. Biyashev has been awarded the Order of Labor Red Banner, the Badge of Honor, USSR medals, and Honorary Diplomas of the Kazakh SSR Supreme Soviet.

On the day of his 80th birthday we wish Gakash Zakiyevich good health and further creative successes.

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UMIRZAK MAKHMUTOVICH SULTANGAZIN

Alma-Ata VESTNIK AKADEMII NAUK KAZAKHSKOY SSR in Russian No 10, Oct 86 p 76

[Article: "The 50th Birthday of Academician of the Kazakh SSR Academy of Sciences U.M. Sultangazin"]

[Text] The 50th birthday and 28 years of the scientific, educational, and public activity of Academician of the Kazakh SSR Academy of Sciences Umirzak Makhmutovich Sultangazin, a doctor of physical mathematical sciences, director of the Institute of Mathematics and Mechanics of the Kazakh SSR Academy of Sciences, vice president of the Kazakh SSR Academy of Sciences, and a CPSU member since 1968, have been celebrated.

After graduating in 1958 from the Kazakh State University imeni S.M. Kirov U.M. Sultangazin began his scientific activity under the supervision of Academician G.I. Marchuk in an urgent field of mathematical physics--kinematic transport theory.

The first scientific results of U.M. Sultangazin, in which he gave a mathematical substantiation of the method of splitting in problems of kinematic transport theory in a general formulation, on the basis of which iterative processes for the solution of multivariate kinematic transport equations were constructed and the theorems of their convergence were proven, proved to be very promising. Subsequently U.M. Sultangazin continued intensive research in transport theory and obtained a number of substantial results: he proved the weak convergence of the method of spherical harmonics for the transient kinematic transport equation, the inapplicability of the Navier-Stokes equation to the description of the structure of shock waves, as well as the local theorem of existence and uniqueness for nonlinear discrete Boltzmann equations; modified the boundary conditions of V.S. Vladimirov; formulated discrete models of the Karleman type, thereby revealing new directions in the theory of quasilinear hyperbolic systems; proposed a scheme of the transition from the nonlinear kinematic equation to generalized solutions of equations of hydrodynamics. These results were included in his doctoral dissertation (1973).

The subsequent theoretical research of U.M. Sultangazin is connected with a number of urgent problems of mathematical physics and its applications. He provided substantiation of the transient version of the method of spherical

harmonics--one of the most prevalent methods of the numerical design of nuclear reactors.

The results of the scientific research of U.M. Sultangazin have been published in more than 100 scientific works in our country and abroad, including in monographs.

U.M. Sultangazin is devoting much time to the education of scientists and is exerting great efforts for the strengthening of the contacts between the mathematics faculties of higher educational institutions of the republic and the Institute of Mathematics and Mechanics. His scientific and educational activity has received recognition in a number of foreign countries (the United States, France, Czechoslovakia), where he has delivered lectures and his students work.

U.M. Sultangazin devoted much time to the development and use of computational and applied mathematics at the Kazakh SSR Academy of Sciences. The Collective-Use Computer Center--a powerful means of the intensification of scientific research at the institutes of the academy--was established under his direct supervision.

U.M. Sultangazin is performing much public work, heading the Federation of Astronautics of Kazakhstan and the small Academy of Sciences.

The scientific community congratulates Umirzak Makhmutovich on his 50th birthday and wishes him good health and new creative successes.

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